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THE ECOSYSTEM APPROACH AS A FRAMEWORK FOR INTER-AGENCY
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FOR INTER-AGENCY PROBLEM SOLVING

ENVIRONMENT CANADA

WATER PLANNING AND MANAGEMENT BRANCH
CCIW BURLINGTON

PRINCIPAL CONSULTANT: BRENDA LEE

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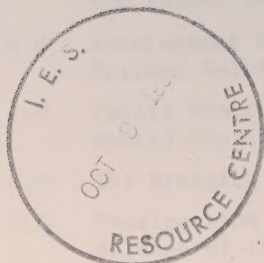
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INTRODUCTION

This report deals with the phenomenon of interagency conflict and cooperation in the implementation of holistic environmental programs. As an initial survey, we have chosen to review the general features of interagency interaction and to suggest methods for achieving consensus within a very specific environmental planning framework - The Ecosystem Approach. By using this framework to identify environmental "stresses" and rehabilitation possibilities, and so structure the existing and potential responsibilities of appropriate agencies, we provide a guide for directing decision-making toward environmentally beneficial goals. Cooperative agreements can then be seen, not as ends in themselves, but as means for achieving ecosystem rehabilitation goals.

We begin with a case study of environmental decision-making in Toronto Harbour from 1974 to 1984, to illustrate concretely some of the characteristics and constraints of interagency interaction. Section Two reviews the problems encountered in more detail and concludes that, as difficulties with organizational structure, the politics of decision-making and with the availability and interpretation of data, the problems are wide-spread. Section Three outlines the history and nature of the Ecosystem Approach, and Section Four details the requirements of interagency cooperation within the Approach.

Through interviews with government personnel and academics experienced in interagency environmental problem-solving, a review of the literature on interagency theory and a workshop conducted with academics and agency personnel on rehabilitation prospects for the Toronto waterfront and aquatic ecosystem, we conclude that the Ecosystem Approach is both necessary and viable. Most of the elements required for its implementation in Ontario are in place or evolving, and it is our strongest recommendation that further development of the approach demands the implementation of a successful test project. Finally, we suggest possible roles for Environment Canada and other governmental and non-governmental groups in this process.

PREFACE

There are very few Canadian case studies which follow interagency decision-making through to the resolution of tough environmental problems. The following case from Ontario, involving Environment Canada and at least seven other agencies and several public interest groups, documents the course of decision-making over ten years through a number of such problems. The attempt to represent carefully the perspectives of such a large number of actors has inevitably created a complex narrative; the situation, as it unfolded was further complicated by recurring disputes over data and jurisdiction. As an example of institutional problem-solving outside of an established framework of agreements, the case illustrates many of the problems with the resultant process of unstructured voluntary cooperation.

DREDGING THE KEATING CHANNEL: A CASE STUDY OF ENVIRONMENTAL DECISION-MAKING

Periodically, the gap between what government officials and the concerned public see as an acceptable decision widens into an unbridgeable gulf. Reaction to a 1979/80 Toronto waterfront dredging and lakefilling project was one such instance. The project was intended to protect the industrial land along the lower Don River from flooding. As the Toronto Harbour Commissioners (THC) proceeded with what they considered to be routine business, business which had a contentious aspect, but which had been ultimately concluded to the satisfaction of all agencies concerned, the Toronto public began to show shock and dismay. The dredging was revealed to involve highly contaminated material and the lakefilling project was to contain it from the surrounding lakewater. Neither had been introduced to the public, or apparently, to the officials within the Ontario Ministry of Environment (MOE) responsible for legislative permits and approvals. "Name Your Poison" ran an editorial in the May 26, 1980 Globe and Mail, calling into question the Ministry's intention to protect the environment under any circumstances. That question was asked of Dr. Harry Parrott, then Minister of Environment, in the Ontario legislature the same day.

As opinion polarized, the Toronto City Council along with many of the city's committees and departments, and several environmental interest groups lobbied to stop the project. The flood risk is a red herring, they argued; the project must have an Environmental Assessment. The flood risk is real, countered MOE, THC and the local conservation authority; it must be reduced by dredging before completion of the EA. The arguments, in fact, extended to the need to dredge for any reason and many of its predicted health and environmental impacts. How situations like this come about is the subject of the following case study.

1.0 BACKGROUND

The case stems from a change in Canada-U.S. Great Lakes management policy: the creation of disposal guidelines for contaminated dredged lake bottom sediment or dredgeate. Prior to the 1970's, dredging was used routinely to construct and maintain Great Lakes navigable waterways⁽¹⁾.

The possibility that dredging and dredgeate disposal might seriously harm aquatic ecosystems was not recognized until the early 1970's. At that time, growing concern over all forms of Great Lakes pollution led to the recommendations of the 1972 Great Lakes Water Quality Agreement, among which was that polluted dredgeate be confined, and that more defined disposal sites be developed. However, these initial statements lacked the technical information to make site-specific recommendations and the Agreement called for the formation of a working group on dredging to address these matters⁽²⁾.

In 1975, the Group released their report. They could not establish a basis for a single set of guidelines, and recommended instead that each situation be reviewed independently and managed to prevent further Great Lakes degradation. The Group then recommended a site specific evaluation which amounted to a complete environmental assessment, minus the "do-nothing" option. These principles and procedures were reaffirmed in 1982 by the IJC

-
- (1) From the 1825 construction of the Erie Canal to the present, dredging played a major role in the building and maintenance of an extensive series of canals, channels, locks and harbours which now links Great Lakes shipping centres. Sediment from these structures needs to be continually removed, and until the early 1970's, it was disposed of in nearby open lake waters. Between 1975 and 1979, for example, _____ were dredged from the Great Lakes (International Joint Commission Water Quality Board 1982).
 - (2) This group, the International Working Group on the Abatement and Control of Pollution from Dredging Activities, was to compile data on dredging and its effects, and to recommend, within two years, site-specific disposal programs.

Subcommittee on Dredging, which was a formal IJC committee established under the 1978 Great Lakes Water Quality Agreement. According to the Subcommittee, each project was to be assessed in terms of "existing site specific historical and ecological information; the physical, chemical and biological characteristics of the dredged material; and (the potential) disposal options." (IJC Great Lakes Water Quality Board, 1982, p.1). If dredgeate was found to be posing a hazard to surrounding ecosystems, then it was to be disposed of in a confined facility.

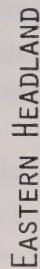
To implement these changes, the original Working Group recommended that specific regulations and administrative procedures should be reviewed; existing legislation, they found, was adequate. Project funding should also be addressed by "the relevant authorities". Implementation, the simplicity of these recommendations suggests, should not be a problem.

2.0 THE CASE OF TORONTO HARBOUR: DREDGING OPERATIONS PRIOR TO 1974

Prior to these changes, the legal and administrative framework for dredging and open-lake disposal in Toronto Harbour was relatively clear. Exclusive federal jurisdiction over transportation and the definition of dredging as a related activity were established by section 91 of the BNA Act. Four federal acts regulated dredging: the Canada Shipping Act, the Public Works Act, the Navigable Waters Protection Act and the Toronto Harbour Commissioners Act. In Toronto, the latter Act appeared to give the Toronto Harbour Commission authority to administer all federal legislation within its designated harbour boundaries. The Act empowers the THC to: "...regulate and control the use and development of all land and property on the waterfront within the limits of the City, and all docks, wharfs, channels and equipment..." (Section 17). These powers have been recently interpreted as "sole jurisdiction over navigation and commercial/ industrial use of all Commission-owned lands along the waterfront" (B. Guest, Director of Works and Aviation, THC, pers. comm. April 1982). Dredging was managed by the THC, assisted by Public Works Canada and co-funded by the two agencies.

Much of the dredging in Toronto Harbour took place in the Keating Channel, an L-shaped channelized portion of the mouth of the Don, the City's largest river. The channel is bisected by the Cherry Street Bridge into east and west sections. Dredging of the east section, next to the Commissioners works yards was funded by the THC; the dredging of the west, leading into the Inner Harbour was funded by Public Works Canada. The former was seen to be related to local harbour business; the latter, to the maintenance of the larger federal harbour waterway. Until 1964, the dredgeate from both sections was deposited in open lake waters just southeast of the Toronto Islands; after that it was used to advance the Eastern Headland (Map 1).

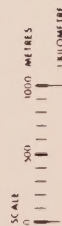
Before 1974, then, dredging was a service administered and financed by two agencies with similar goals and a clear interpretation of jurisdictional mandates. Neither public nor environmental concerns complicated what was essentially a straightforward engineering process.



MAP 1: DESIGNATED FEATURES ORIENTATION MAP

The Central Waterfront

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MAR., 1984
STEPHENG McLAUGHLIN, COMMISSIONER



3.0 DREDGING AFTER 1974: THE EXPANSION OF JURISDICTIONAL CONCERNS

This stable structure of authority disappeared, in 1974, when the Federal Department of Environment and Provincial Ministry of the Environment asked the THC to comply with the new International Joint Commission dredgeate guidelines. Channel sediment was found to be so contaminated that it could no longer be disposed of in open waters - it would have to be confined, and ultimately sealed off from both terrestrial and aquatic environments. The coincidence of a number of circumstances then threw the issue open to the discretionary problem-solving capabilities of almost every agency involved in Toronto's central waterfront.

Perhaps the most important circumstance was the financial situation and the independence of the lead agency for dredging - the THC. According to IJC guidelines, this agency had the responsibility for preparing a comprehensive assessment of dredging impacts and disposal alternatives and also for developing a funding mechanism for the project. An assessment was carried out by the THC in late 1975 but it defined the project in a way that no other agency could accept, stressing as it did, their financial obligations rather than those of the THC. Their adherence to such an unpopular position eliminated, right at the outset, those aspects of lead agency function which involved coordination and compromise.

3.1 The THC Mandate

The Toronto Harbour Commission shares, with the Hamilton Harbour Commission, a unique degree of autonomy among Canadian Port Authorities. Harbour Commissions in general are administrative bodies which temper the strength of federal powers over transportation and related activities by conferring to the local Commission administrators a high degree of freedom over port management. Harbour Commissions for Canadian ports were created under separate federal statutes until 1964 when the Harbour Commissions Act standardized their jurisdictions and powers. All existing Commissions were brought under the Act except Toronto and Hamilton, who objected to the Bill in the Committee stage. These Commissions were concerned that

according ultimate administrative authority to Ports Canada and Transport Canada would jeopardize their freedom to respond to municipal conditions. As a result, both Commissions retained the sole authority to administer federal legislation, and to represent federal interests within their harbour boundaries.

However, the present legal status of the Toronto Harbour Commissioners is unclear. Created by federal statute, they may or may not be an agent of the crown and, as such, may or may not be subject to federal legislation. Responsibility for ensuring that all relevant legislation is addressed may thus rest either with the THC themselves, or with the appropriate federal department.

The THC's structure and mandate also give them considerable linkage with the City of Toronto. Three of the five Harbour Commissioners are appointed by the City Council, and one by Governor-in-Council (i.e. Federal) on the recommendation of the City's Board of Trade; four of the five Commissioners can therefore be said to be in some sense accountable to the City. The THC holds and administers property for the City, its surplus profit is to be paid over to the City Treasury and its accounts are to be open to City audit at all times. (Sections 7, 15, 17 and 18 of the Toronto Harbour Commissioners Act, 1911.) Historically, however, the THC have not accounted regularly to the City for their policies and programs; the City's means to gain their cooperation having been restricted so far to moral and political suasion. Since the decline of shipping as a harbour priority in the mid-1960's and the subsequent development of opposed visions for harbour reconstruction, this suasion has only been intermittently effective.

3.2 THC Finances and Their Effect on Negotiations

The particular effects of this clash of values for harbour use will be discussed later. Suffice it to say at this point that the THC had a history of managing lands for maximum profit, and felt financially unable at the time of the assessment to shift these priorities. By 1974, the THC was in financial difficulty, and the Keating Channel had become more of a

burden than a resource. Shipping in the channel and the flow of related revenue had virtually ceased. As operating costs increased, the spring clean-up of the Channel had become increasingly less cost-effective. At that time, the THC were "looking to everyone to get financial contributions towards their operating costs, part of which related to the clean-up of the debris and the Keating Channel dredging" (D.C. Doherty, City of Toronto Department of Public Works, pers. comm. May 1982).

The Commission thus sought to redefine the benefits and beneficiaries of dredging and the new IJC disposal guidelines offered an opportunity to bring the responsible agencies to the negotiating table. Benefits were initially assessed, then, as environmental, flood-protection and navigational, in that order. The agencies responsible for funding, if this were the case, would be Environment Canada, the Metropolitan Toronto and Region Conservation Authority (MTRCA) and Public Works Canada/THC respectively. These were, in fact, the agencies designated for funding assistance by the Commissioner's initial 1975 report on dredging/disposal options. By giving first priority to functions which had not previously been associated with dredging, the THC had now vacated the role of lead agency and was attempting to fill it, for funding purposes, with two agencies whose slim jurisdiction over the process, had never been exercised.

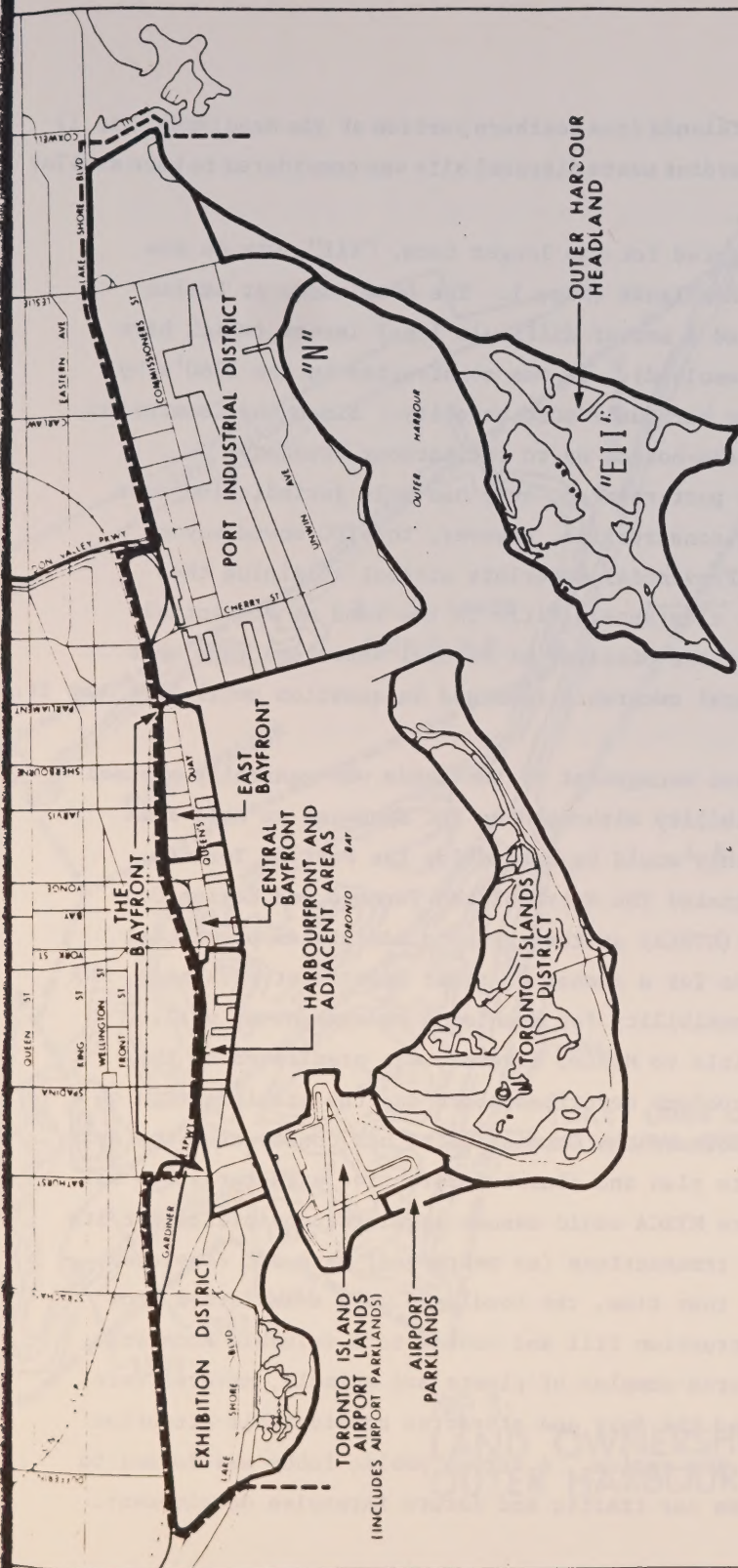
3.3 The Inclusion of Waterfront Management Issues

The jurisdictional environment was further complicated by THC's selection of two potential disposal sites, just off the shore of Toronto's central waterfront. Both the number of agencies and the related issues encompassed within their mandates increased significantly. A function related solely to transportation had, by these developments, become a function related to land and water use, environmental quality, flood-protection and the management of public concern. In this larger jurisdictional environment, a new array of managers and management areas came into play. These require a brief review in themselves.

(i) Harbour Planning

Strictly speaking, the jurisdiction for central waterfront and harbour planning lay with the City of Toronto and the THC. As discussed earlier, their partnership, by 1974, had become ill-defined and contentious. The THC's interpretation of its mandate conflicted directly with the City's powers under the Planning Act and the Municipal Act to administer land use and development controls over all lands within its boundaries. Although higher levels of government are not legally bound by the City's Official Plan policies and by-laws, the City attempts to secure their cooperation through negotiation, and by the preparation of separate legal agreements. The THC was not only unfamiliar with the open planning style which the City, under Peter de Tolly, had initiated to determine waterfront land use policies, but it believed, in fact, that decisions about the use of its lands was its sole prerogative. This history of independent planning combined with the often radical differences in planning goals for the harbour contributed to a state of uncertainty about its future development which persisted through the Keating Channel decision process.

The two areas most important to the process were, obviously, those under consideration for dredgeate disposal sites. The first, or short term site, "N", was in the northeast corner of the Outer Harbour just west of the Hearn outfall (Map 2). It falls under the THC's jurisdiction; and the Commission was (and is) holding the lands along the Outer Harbour's North Shore for possible future port-related industry. They form the southern boundary of the harbour's active industrial area but are currently used only for recreation. They contain, in fact, one of the only easily accessible public beaches which can be intensively used for sailing and windsurfing - the rights to which are protected vociferously by local user groups. During the Keating Channel decision period, City planners argued strongly for uses which would protect the recreational potential of the North Shore. New heavy port-related industry was not only incompatible with existing uses, it would endanger the environmentally

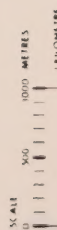


MAP 2: DISPOSAL OPTIONS

CENTRAL WATERFRONT DISTRICTS

The Central Waterfront

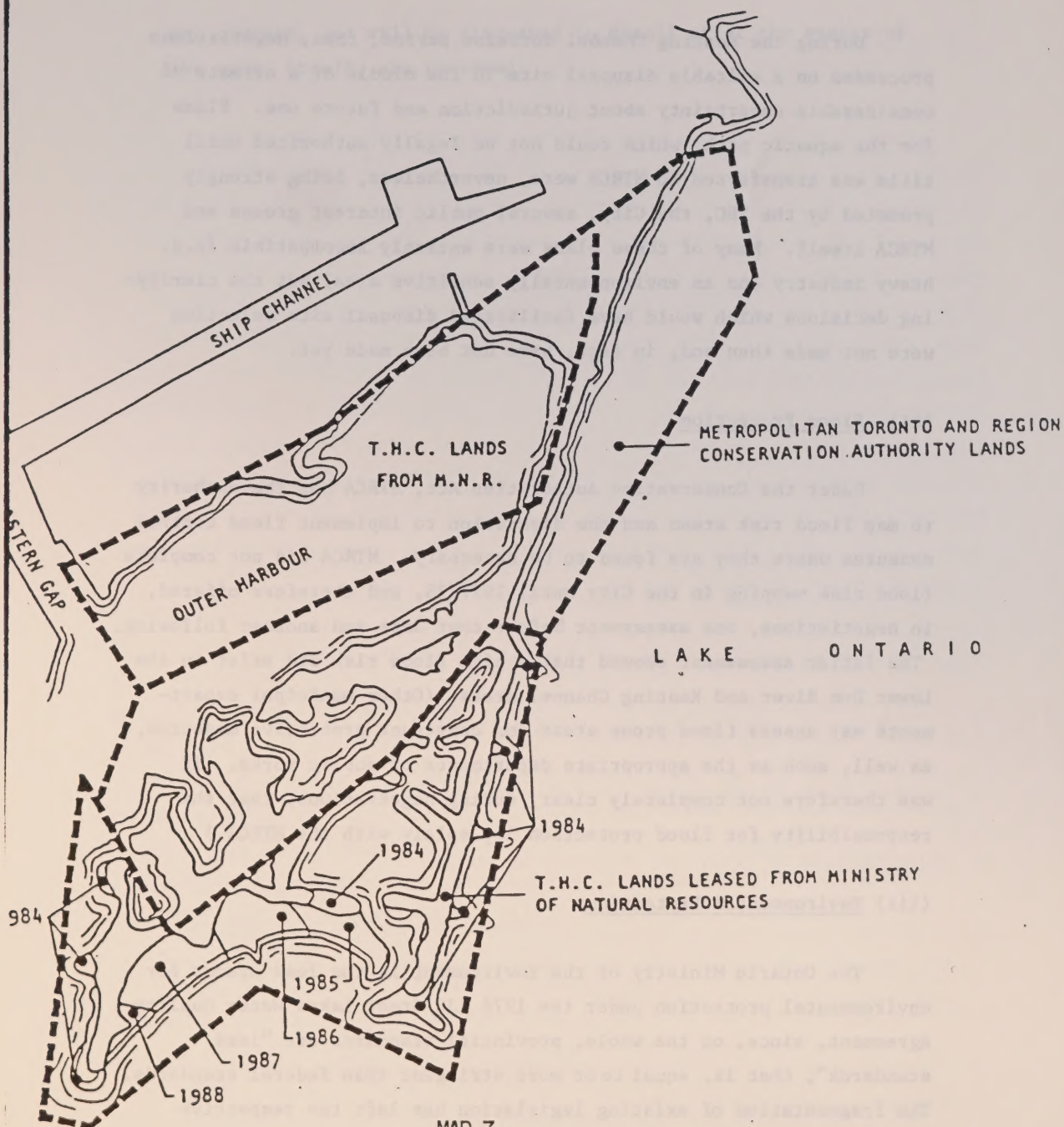
CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MAR., 1984
STEPHEN G. McLAUGHLIN, COMMISSIONER



sensitive aquatic parklands (the southern portion of the headlands, Map 1) across the bay. A hazardous waste disposal site was considered to have similar impacts.

The site considered for the longer term, "EII", was on the eastern side of the headlands (Map 2). The headlands, or Leslie Street Spit, presented a set of difficult legal issues (which have not yet been fully resolved). It was constructed in the 1960's by the THC to expand the harbour's port capacity. Since the Commission appears to own the lake-bottom up to the harbour boundary and construction was port-related, they had sole jurisdiction over the project. During construction, however, the THC moved beyond Commission-owned to Provincial waterlots without obtaining the requisite Provincial clearance. Title to the land on Provincial waterlots was held by the Minister of Natural Resources (MNR) but the status of its legal ownership remained in question until 1984 (Map 3).

This was because management of the lands was generally assumed to be MNR's responsibility although the THC appeared to hold some residual hope that they would be needed for the Port of Toronto. Having earlier designated The Metropolitan Toronto and Region Conservation Authority (MTRCA) as the agent to administer provincial policies and programs for a number of other waterfront parklands, MNR gave MTRCA the responsibility for headlands management as well. Transfer of legal title to MTRCA, however, was predicated on the resolution of the problems described above and the stabilization of headland erosion. Because the Commissioners had constructed the spit, they were required to plan and finance protective structures for all eroding points before MTRCA would assume legal responsibility for its development. These transactions (as mentioned) were not completed until 1984. During that time, the headlands were transformed from a wasteland of construction fill and rubble to a valuable ecosystem. An increasingly diverse complex of plants and animals, several rare in Ontario, colonized the Spit and attracted considerable attention from naturalists in the region. A strong public lobby was formed to protect the Spit from car traffic and future intensive development.



MAP 3:
LAND OWNERSHIP ON THE
OUTER HARBOUR HEADLAND

During the Keating Channel decision period, then, negotiations proceeded on a suitable disposal site in the middle of a climate of considerable uncertainty about jurisdiction and future use. Plans for the aquatic park, which could not be legally authorized until title was transferred to MTRCA were, nevertheless, being strongly promoted by the THC, the City, several public interest groups and MTRCA itself. Many of these plans were entirely incompatible (e.g. heavy industry and an environmentally sensitive area) but the clarifying decisions which would have facilitated disposal site selection were not made then and, in fact, have not been made yet.

(ii) Flood Protection

Under the Conservation Authorities Act, MTRCA has the authority to map flood risk areas and the discretion to implement flood control measures where they are found to be necessary. MTRCA did not complete flood risk mapping in the City until 1977/78, and therefore offered, in negotiations, one assessment before that date and another following.

The latter assessment showed that a high flood risk did exist in the Lower Don River and Keating Channel areas. (Other municipal departments may assess flood prone areas and construct protective measures, as well, such as the appropriate departments of public works. It was therefore not completely clear, during negotiations, that the responsibility for flood protection lay solely with the MTRCA.)

(iii) Environmental Protection

The Ontario Ministry of the Environment is the lead agency for environmental protection under the 1978 IJC Great Lakes Water Quality Agreement, since, on the whole, provincial standards are "lead standards", that is, equal to or more stringent than federal standards. The fragmentation of existing legislation has left the respective roles of federal and provincial agencies open to negotiation in specific cases, however. The environmental control of the Keating Channel dredging and dredgeate disposal was a matter of particular confusion

and concern, and will be discussed in detail after the events of the case, itself, are reviewed.

4.0 INTERAGENCY NEGOTIATIONS PHASE ONE: PROJECT FUNDING AND DISPOSAL SITE SELECTION

To recapitulate, the Toronto Harbour Commissioners produced in December 1975 a report in response to the IJC concerns about dredging in Toronto Harbour. This report reflected the quite simple jurisdictional world that the Harbour Commission had existed in for many years, and which they saw little reason to alter. However, in the meantime, a number of other agencies and concerns had grown up or involved themselves in waterfront and watershed-related issues. THC, by trying to divest itself of financial responsibility for much of the dredging, necessarily began involving other agencies in the process. By trying to site a hazardous waste facility on the waterfront (which was the effect of restricting the dredge-ate site possibilities to "N" and "EII") the Commissioners also brought to the forefront, environmental issues of a new magnitude. A whole new complex jurisdictional world was thus opened up and invoked, a world which no single agency - let alone the THC, could properly manage.

The Commissioners' report recommended the following steps:

- o initiation of construction on a short-term facility at site "N"
- o investigation of the feasibility of site "EII" for long-term use
- o determination of ownership of the land created
- o provision of funding assistance by Environment Canada and MTRCA, since the benefits of the program would be environmental, flood-protection, and navigational, in that order.
- o initiation of a water quality monitoring program around dredging and disposal construction sites
- o promotion of a program of sediment and contaminated effluent reduction in the Don River.

The Commissioners' report did not mention:

- o assessment of alternatives to a full scale dredging program
- o assessment of the land use implications of the recommended disposal sites and resolution of the legal and jurisdictional issues blocking such an assessment at the time
- o assessment of the appropriate framework of environmental controls including the applicability of EARP and the new Provincial Environmental Assessment Act - to both the dredging and the disposal site construction projects
- o assessment of the relationship between sediment build-up in the Keating Channel and flood hazard in the Lower Don River area.

The response to the report, which was the culmination of months of discussions with MOE (Water Resources Branch) and the Federal Environmental Protection Service (EPS), may not have been what the Commissioners expected. All requests for funding were denied, despite earlier indications from EPS that funds could potentially be obtained from the federal Ports and Harbours Planning Committee (MOE) (such funds would have been predicated on a proposal for associated harbour development). EPS and MOE denied that dredging would have environmental benefits and MTRCA responded that "Under Design Flood Conditions, the lack of dredging in the Keating Channel would have virtually no effect on the extent of flooding which would be experienced in the Lower Don" (McLean 1976, in Lee 1982 p. 8).

While the denial of funds for dredging itself may be understandable (construction of the disposal site was, in fact, a revenue-earning project), denial of support for a full scale study of the problem is less easy to understand. As Jack Jones, THC's Chief Engineer, pointed out in 1976, the responsibility for dredgeate disposal in the U.S. was borne by the federal government. The Corps of Engineers had undertaken a five-year research project and were carrying out site specific studies, designs and field tests.

Reactions to the two suggested disposal sites were mixed; understandably given the conflicts in jurisdiction and development priorities just discussed. MOE, EPS, and Metro Works eventually chose site "N": it was protected, presented no obstruction to the Metro Sewage Treatment Plant (STP) effluent dispersal (Map 1) and could be more quickly and cheaply constructed. They were against site "EII" primarily because of its exposure to open lake wave action and its potential to obstruct the STP sewage outfall, but also because it would be more costly and time-consuming to construct. The City of Toronto preferred "EII" by default. As discussed earlier, City planners did not want a hazardous waste disposal facility adjacent to a heavily used recreational area and an environmentally sensitive park. THC preferences shifted from "N" as a short-term options, to "N" as the only option in 1977, to "EII" as the only option in 1978. This ultimately allied the Commissioners with the City in promotion of perhaps the least environmentally sound site.

Early in 1976, then, a stalemate had been reached and the THC simply stopped dredging. Two years later, the situation had not improved. No agency had offered money for either the dredging or the study initially proposed by the Commissioners, nor had any agency compromised on their original choice of disposal site location. All positions were strongly held, and since the need for the project itself was in doubt, there was no incentive to act. The situation in January 1978 was summed up by R.L. Clark, Commissioner of Works for Metro Toronto:

"No single agency accepts the responsibility or has the funds available to cope with the problem (dredging and disposal of dredgeate for flood protection). It appears to be only a matter of time, if no action is taken, until the combination of silting, lack of dredging, and potential piling up of ice during a winter or spring thaw, will cause a serious damming of the Don River flow, with resulting flooding of areas adjacent to the river, including private premises as well as the Don River Parkway.

The problem appears to require resolution at the political level... "

This was a situation which was clearly not anticipated by the International Joint Commission, whose only guideline for implementing the new dredging procedures was the suggestion that "there may be a need to modify regulations and improve administrative procedures" (IJC 1975, p. 143).

The role of lead agency implied in this directive, vacated by the THC, had not been filled by EPS, MOE or MTRCA. In the absence of compelling legislation, the Commissioners had effectively set the project "adrift" among a set of government agencies, none of which had the mandate or political will to act as project proponent. From an organizational perspective, this is the major reason for the ensuing four year delay.

5.0 INTERAGENCY NEGOTIATIONS PHASE TWO:
FLOOD RISKS AND THE RECONSIDERATION OF OPEN LAKE DISPOSAL

By 1978, the two years of sediment build-up in the Keating Channel had been mapped by MTRCA in their city-wide flood risk mapping and control program, and was shown to present some danger. Land use and jurisdictional conflicts still hampered any movement on the disposal site selection question although MOE, EPS and the THC had been aware of the need to settle the headland ownership question since at least March 1975. Without a disposal site, the flood threat pressed the agency representatives toward another immediate disposal solution. The THC, MTRCA, MOE, Metro Parks, and the City of Toronto Planning Board all recommended that City Council endorse immediate dredging of the Keating Channel and disposal of the material in the open lake water - despite the judgement that the quality of the dredgeate was "as bad as you can get". They also recommended that funds for "a study for longer term solutions" be requested from the federal government. Although the EPS was the only agency to consistently oppose the plan and opt for environmental protection over swift resolution, it must also be said that the EPS again did nothing to expedite funding for the study of environmentally sound alternatives.

6.0 INTERAGENCY NEGOTIATIONS PHASE THREE:
THE MULTI-PURPOSE SOLUTION

By 1978 the Toronto Harbour Commissioners had proven themselves to be the most uncooperative and unpredictable negotiating partner. Having denied responsibility for channel dredging and disposal site development, and having stopped maintenance dredging in the channel on the grounds that it was not used for navigation, they then refused to confirm or deny any navigational plans for the channel for MTRCA. The navigational incentive for a full scale dredging project was therefore minimal.

Navigational usage denied by the THC, environmental benefits denied by MOE and EPS, the momentum for dredging was by this time fueled only by fears of flooding. Pressure to dredge was, in fact, being exerted on City Council by members of the City's Southeast Area Industrial Coordinating Committee, whose businesses were being threatened by silt build-up in loading berths and the flood risk in the vicinity of the Keating Channel. The flood risk was not a clear issue either, however. EPS, Public Works Canada, the City of Toronto Public Works Department and some officials within MOE judged that the Keating Channel sediment build-up represented no real flood hazard. The THC, MTRCA, MNR Conservation Authority Branch and other personnel within MOE, on the other hand, saw the sediment build-up as a significant flood threat. As late as December 1978, no agency accepted the responsibility for flood protection in the area.

In the face of business pressure to dredge, however, a coincidence of development opportunities broke the disposal site selection deadlock. The THC, late in 1978, released plans for the headland stabilization required by MNR and MTRCA. The plan took the form of an additional "arm" on the spit's eastern edge. Between the spit and the "arm" lay sufficient space for containment cells which could hold upwards of 20 years of dredgeate. A request to the City from the Toronto Construction Association for disposal sites for central area construction fill served as the final impetus for the design of a multi-purpose project. The project served the independent needs of the THC, the City, and MNR/MTRCA, and was therefore

reluctantly and conditionally approved by both EPS and MOE in February, 1979. On February 28th, THC, MTRCA, and the Federal government through Public Works Canada signed an official funding agreement for a three year dredging and endykement project. For the THC, the agreement initiated a large dredging and construction project. For the Federal government, the project would restore a navigable draft of 27 feet in the Keating Channel west of Cherry Street Bridge; for MNR and MTRCA, it would relieve the flood risk in some areas of the Lower Don River. Provincial funding, however, was contingent upon the yearly review and approval of dredging plans by Toronto City Council.

7.0 PUBLIC REACTION TO THE PROJECT AND ITS ENVIRONMENTAL CONTROL STRUCTURE

In April of 1979, the Harbour Commissioners began to direct the first truckloads of fill out onto the Eastern Headlands. The act which might have symbolized the end of debate on the dredging issue - at least for the period of the three year agreement - initiated instead a new round of conflicts. These stemmed from the project's environmental control structure and public access to decision-making on land use and environmental issues.

The administration of environmental controls is the most complex and important issue in this case study, for Environment Canada's purposes. Dredging and the construction of the disposal endykement were treated as separate projects, each with their own funding and regulatory arrangements. Those for the endykement will be reviewed first.

The endykement was designed, and its construction supervised, by the Toronto Harbour Commissioners. It began on Commission waterlots and moved almost immediately onto provincial waterlots, but as in the case of the headland itself, without prior Provincial clearance. It was an addition to an existing structure - the headland - which had been built before the Ontario Environmental Assessment Act was passed. Since the construction did not receive public funding (it was, in fact, a major revenue producer for the THC), the Commissioners could be considered the sole project proponent. If this were the case, the application of any federal or provincial regulations would be unclear since: (1) the THC may be exempt from both; but (2) construction on provincial waterlots may be subject to applicable provincial legislation, whatever the operating body.

To say that the THC is sole project proponent, however, is to disregard the involvement of the province and municipalities in the funding of the dredging project. An equally important function of the project was its containment of contaminated dredgeate. Government funding of the dredging project was clearly contingent upon the construction of a facility for its containment, and if this contingency carried with it legal

obligations, then all federal and provincial laws would obtain. Only the applicability of the Ontario Environmental Assessment Act was clouded, and this by the possibility that the endykement was exempt under either the "grandfather" clause in the EA Act, or a blanket exemption given to MTRCA's activities when the Act first came into enforcement (MTRCA, had, in the three year intergovernmental funding agreement, been named principal proponent of the dredging project). In practice, construction proceeded with the conditional approvals of EPS, MOE and the City of Toronto, but without the permits and approvals required under the Ontario Environmental Protection Act, the Ontario Environmental Assessment Act, the Ontario Water Resources Act and the federal Fisheries Act.

In the public's eye, the seriousness of this situation was illustrated by the THC's subsequent failure to comply with the construction conditions which had been laid out by MOE and EPS in their approval of the dredging and endykement project:

- By May (six weeks later), THC had violated MOE's conditions and created "extensive water quality violations".
- Monitoring data requested by MOE in June was still not forthcoming from THC by February 1980.
- High phosphorus and nitrogen levels were recorded and presumed to be from the truckfill.
- In July, THC dredged the Victory Soya Mills slip and, notwithstanding an EPS order not to carry out open water dumping, had disposed of the heavily polluted material "in or near the Keating Channel".
- From July to October, a plume of turbidity extended from the dumping area west, at times moving six kilometers to the Toronto Island Water Filtration Plant.

The THC's record worried individuals in EPS and MOE as well. In the spring of 1980, S.E. Salbach's now public and somewhat infamous memo to W. Bidell and C.J. Macfarlane⁽³⁾ itemized THC's transgressions to date (as above) and requested that "MOE's participation in the dredging and

(3) MOE, Intra-ministry Memo from S.E. Salbach, Assistant Director, Water Resources Branch to W. Biddell, Assist. Deputy Minister and C.J. MacFarlane, Director, Central Region. Re: Keating Channel, February

endykement project (be re-evaluated)." Salbach went on to say that "The THC consistently fails to live up to their promises with the result that MOE is left in a very embarrassing position with respect to maintenance of water quality. Should Keating Channel polluted dredge spoils be dumped at the site in 1980, there is a high probability that the Toronto Island Water Intakes would be affected. Certainly MOE Water Quality Criteria would be violated."

In May, 1980, the circumstances of the endykement construction, including its lack of legislative framework became known to the Canadian Environmental Law Association (CELA). CELA quickly voiced their objections to the Ontario Ministries of the Environment and Transport, the federal Departments of Environment, Fisheries and Oceans, and Public Works and to all the local papers. It was their assessment that all federal and provincial legislation and procedures applied to the project, including both federal and provincial environmental assessment - the provincial "grandfather" clause, notwithstanding.

The legal framework for the dredging project was somewhat less contentious. Funded directly by all government levels, it was subject to both federal and provincial controls. With MTRCA as primary proponent, the most appropriate environmental assessment procedures were provincial. The Ontario Environmental Assessment Act was not applied to the dredging project immediately, however. Discussion of the provincial environmental procedures initially delayed MOE's issuance of permits to dredge in the spring of 1980. These were released later with conditions but no approvals or exemptions under the EA Act. Toronto Mayor John Sewell (responsible for yearly project approval), CELA, and a coalition of public interest groups were not prepared to waive or delay EA procedures, particularly in light of the THC's construction practices. For the next two weeks, articles and editorials in both the Toronto Star and the Globe and Mail, as well as arguments in the provincial legislature urged the Minister of the Environment to place the entire project under the EA Act. While two weeks is not a long time administratively, the press generated during this period eroded public confidence in MOE and Dr. Parrott, (then) provincial

Minister of the Environment, and heightened public awareness and mistrust of events to follow.

On June 6th, provincial funding was confirmed to be contingent upon the preparation of an EA, but that EA was to proceed under curious and self-defeating conditions. The initial three year project approved and funded in February 1979 was to be exempt from The Act on the basis of the flood-threat emergency it was intended to relieve. Construction of the containment site was also to be exempt from The Act; both were to proceed while the EA determined if, in fact, dredging was necessary and which of a number of land and waterbased disposal alternatives for dredgeate disposal was most appropriate. This was seen as an acceptable substitute for the EARP panel hearings since EPS personnel at the time believed that the project would not result in significant environmental impacts or public concern.

Understandably this situation was seen to lack coherence and concern for environmental protection by those who were not party to the original decisions (e.g. the public interest groups). Each spring, City Council's mandatory review of the THC's dredging plans - required before MOE could issue an exemption to the EA Act for further dredging - drew angry and increasingly organized audiences. Opinion was so divided on the legitimacy of the flood-threat "emergency" and the need for emergency dredging during preparation of the EA, that Cabinet approval was required to obtain the first exemption. On April 9, 1981, at the request of the Premier, Mr. Ivan Lorant undertook a six month study of the flood risk and the efficacy of emergency dredging. His findings, released that July, were interpreted as further evidence in support of both pro-and anti-dredging arguments.

8.0 THE DREDGING PROJECT: WHO DID IT SERVE?

The 1979 funding agreement can be viewed as an expedient response of senior officials to the risk of compensating costly damages if flooding, in fact, took place. That several other outstanding issues would also be resolved added impetus to the decision, even if doubts existed about the appropriateness of the large and costly solution to such a localized and probabilistic hazard. As it stood, the project served the independent needs of each co-funder:

- o The Toronto Harbour Commissioners obtained a large construction project and external funds for dredging east of the Cherry Street bridge (formerly the THC's sole responsibility) during a period of financial stress.
- o Public Works Canada, while funding only one third of the project, obtained full restoration of navigational depths in the Channel west of the bridge and in adjacent berths, and, therefore, relief of the potential of silt east of the bridge to wash into the western segment.
- o MTRCA and MNR's Conservation Authority obtained relief from the Lower Don River flood hazard more cheaply than if the Authority had undertaken measures on its own.
- o The City of Toronto also obtained relief from the flood threat, and the responsibility for expensive compensation although the procedures for doing so, involving exemptions from the EA Act, were less acceptable.
- o MOE received relief from the flood threat, although, since flood protection is not the Ministry's responsibility, it is more difficult to interpret its direct benefits.

9.0 CONSTRUCTION OF THE CONTAINMENT SITE DURING THE EA; RELEASE OF THE DRAFT EA

The exemption of the endykement from the EA and its construction during EA preparation was similarly viewed in a number of ways by agency personnel and the active public interest groups, including CELA. The EA Terms of Reference had been approved by all federal and provincial agencies, without consideration of the endykement construction, but it seemed clear to the public groups involved that this was a mistake. The project was sufficiently large, contentious and important to the future planning of the headlands that its close and comprehensive investigation should begin immediately. The fact that most of the project was constructed on provincial waterlots without official sanction was ample legal basis for its inclusion in the EA. Further, the construction of one of the four disposal alternatives considered in the EA (the others were site "N", one southwest Scarborough abandoned gravel pit and open lake disposal) would undoubtedly prejudice the cost-benefit calculations used to help choose the final site. Personnel from EPS and the City of Toronto Planning and Development Department agreed with CELA: construction of the endykement should stop and the project should be considered by the EA. MOE, MTRCA, MNR and THC disagreed for reasons which will be discussed below.

In March, 1982, the draft EA was released for comment. Of the four disposal options, site "EII" on the headlands was chosen because: it was secure, it already contained contaminated dredgeate with no major environmental impacts that could be identified, no new construction would be required to provide 20 years of dredgeate storage and its estimated future uses would not conflict with existing or projected uses of the headlands as a whole. As well, the complete dredging of contaminated sediment from both east and west sections of the Keating Channel was recommended. The major rationale for the large project was that dredging only to reduce the flood risk would cut into the most heavily contaminated sediment layer in the channel and expose it to eroding hydraulic action. That layer should be entirely removed and sealed off, leaving the channel free to trap current, cleaner sediment from the Don River.

These conclusions came as a surprise to no one. Agreeing with the EA Terms of Reference & its conclusions and anxious to proceed with the project were MOE, MTRCA, MNR and THC.

- o MOE Environmental Assessment Section: The existence of a completed disposal site was assured not to bias the EA; alternate sites would be reviewed in equal depth before the EA would be accepted.
- o MOE Water Resources Branch: The EA Terms of Reference defined a project that allowed MOE to carry out its water quality protection mandate. Other considerations were not relevant and therefore not considered by the Water Resources Branch in its review of those terms.
- o MTRCA: The endykement was, and should have been exempt from the EA because it was an addition to an existing structure - the headlands - the construction of which was not subject to EA. The endykement was therefore exempt under the "grandfather" clause of the EA Act.

The EA Terms of Reference did not address land use planning issues because these would have to be resolved in a comprehensive planning process, a process which could not begin until ownership of the headlands was determined. Until this occurred, the EA could only ensure that the range of probable uses of the headlands would not be jeopardized by the endykement and disposal facility.

The existence of the endykement did not prejudice the choice of a disposal facility in the EA because the EA surveyed all sites with state of the art technology; site "EII" was, by all accounts, simply the best.

- o MNR Conservation Authority: The framework of regulatory controls for the endykement was assumed to be the same as that used for the headlands. This was a framework developed in the mid 1960's. The endykement, in fact, was needed regardless of its use for a containment facility, and its construction should not be predicated on its approval for that purpose. "The endykement concept was agreed to by provincial and federal governments. If no more than one basin is required for the combined emergency flood protection/navigational dredgeate, then basins two and three can be used for other purposes" (J. McFadden, 1982 pers. comm. in Lee 1982).

10.0 CONCLUSIONS: A LOOK AT THE PROBLEM AS A WHOLE

There are clearly as many perspectives on the problem of Keating Channel dredging and dredgeate disposal as there are agencies and interest groups involved. From a perspective outside their debates, the problem includes the issues of concern to all of them, regardless of their formal recognition in the Environmental Assessment. The inextricability of the problems of dredging, water quality and disposal site planning was, in fact, demonstrated by the inclusion of many of the issues which for so long had been excluded from EA proceedings, in its final form (fall, 1984): headland and endykement ownership and the planning options for both areas, for example. There are many reasons why the responsible agencies could not develop a more integrated approach to the problem from its beginning, and it is suggested here that they fall into three main categories: the organizational structure and legal mandates of the agencies involved; the politics of public participation and decision-making and the interpretation and availability of information.

10.1 Organizational structure

1. There were a number of "blocks" to cooperation between major agencies:
 - o Jurisdiction: The jurisdictional issues which emerged during the course of this case were responsible for many of its problems. These related to control over THC activities; ownership of the Leslie Street Spit; regulation of endykement construction under provincial EA legislation; and applicability of EARP as a method of augmenting provincial EA procedures, where federal funding is involved and provincial procedures are judged to be inadequate.
 - o Conflicting interests of participating agencies: Each agency viewed the project through the perspective of its mandate and had some difficulty moving out of its constraints. The constraints in this case included past interpretation of jurisdictional influences and regulatory controls, as well as the limits of responsibility set by branch and departmental specialization. Further, and perhaps ultimately more important, each agency represented a different social perspective on the environment, many of which were (and are) incompatible.

2. The legal framework for environmental controls was fragmented, inconsistently applied and, to further complicate matters, changing.

- o Change in environmental control structure as a major project progresses over many years: what are the limits to the use of "grandfather" clauses, and how can agency personnel become accustomed to the use of different, stricter, more time-consuming and expensive environmental controls? (e.g. MNR's position above)
- o Timing of the development of project-specific environmental controls: When the control framework is developed after project approval, as it was in this case, then conflicts between project timing and budgeting with and without control mechanisms are bound to arise.

3. No formal mechanisms were created for overcoming the blocks to inter-agency cooperation, and those which might have been used to clarify decision-making roles (e.g. the Environmental Assessment Act) were not used for this purpose.

- o Leadership: The initial selection and funding of a dredgeate disposal facility required strong leadership to facilitate the negotiation of a compromise between strongly held, conflicting views. As events changed the implications of the subsequent 1979 funding agreement, leadership with a mandate to consider both environmental and land use issues was required to press for a comprehensive, publicly acceptable framework for the EA.
- o The structure of interagency cooperation: Further, since the continuing interagency negotiation process was informal and unstructured, there was no mechanism to gain agreement and cooperation among agencies whose strengths and interests were quite different. The THC, for example, with a very wide mandate, stable funding and virtually autonomous control over activities, could not be prevented from withholding information and shifting positions throughout the process.
- o The Environmental Assessment Act: There was little agency support for use of the EA Act to resolve any of these problems.

10.2 The politics of public participation and decision-making

There was disagreement and confusion among the various groups who had and who wanted decision-making power:

Elected politicians vs. government officials; government vs public.

- o The politics of decision-making: Major decisions were made by senior administrators and politicians which significantly reduced the scope of the dredging and disposal problem. The decisions not to include the original three year dredging project or the construction of the containment site in the environmental assessment are two of the most important. In this case, however, the agencies involved made political intervention inevitable by allowing the flood threat to increase to a stage where it created considerable public concern.
- o The role of the public: Throughout this case, a discrepancy existed between the public and agency personnel about the place of public involvement in the interagency planning and decision-making processes. According to MTRCA, the public was not brought into initial planning because its participants misjudged public reaction. Similarly, EPS did not recommend the process for EARP panel hearings because EPS staff, technically rather than socially trained, misjudged the level of public concern which it would generate. The over-riding feeling of agency personnel was that both federal and provincial environmental assessment procedures were mechanisms for appeasing public concern rather than for ensuring publicly accessible and acceptable, comprehensive project planning and decision-making. Since informed public groups hold the latter view, which is more in line with the intent of the EA legislation, there is clearly a need for further integration of effective public participation measures into inter-agency planning processes.

10.3 The availability and interpretation of data

Conflicting interpretations of data, particularly with the significance of risks to public health and safety were used by various parties in conflict to entrench their positions. Agreement therefore remained blocked on issues which were potentially verifiable as well as those open to different value-based interpretations.

- o Conflicting information: here is therefore a need to identify and resolve conflicts based on empirical information early in the project planning stages (in this case, on the magnitude and significance of the flood risk particularly).

10.4 Time

And finally, the process simply took too long.

- o Length of time for the decision process: The ultimate results of these difficulties was that decisions were reached and acted upon far too slowly. The process can be said to have taken considerably more time and therefore resources than was necessary

SECTION TWO: INTERAGENCY COOPERATION - THE NATURE OF THE CONSTRAINTS

The previous section outlined one example of decision-making in a complex institutional environment where failure to create a problem-solving structure caused extensive delays, fostered public concern and mistrust and in fact, added a second flood-related risk to the original transportation - related problem. This situation is, by any standards, one of the most complex, and it might be asked whether the constraints which operated here (listed in the case study's conclusion) are characteristic. This section assesses each of the constraints listed as major, and concludes that, while they may not be typical in intensity, they are certainly typical in type. That is, all interagency interactions may be assessed according to their organizational structure and function, their politics and their data problems, and each of these aspects has significant operational and conceptual difficulties. Cooperation among independent agencies, is, in short, not an easy phenomenon to predict, bring about or describe.

Having said this, the remainder of this report attempts to do all three, to varying degrees. This section briefly reviews the major constraints to voluntary interagency cooperation, initially illustrated by the Keating Channel case study, and the history of their institutional development. The following section then turns to the ecological aspect of environmental decision-making, and outlines a framework for ensuring that attempts to achieve interagency cooperation do so with environmentally beneficial results. This section includes the results of a half day experiment in interagency cooperation for the Toronto aquatic ecosystem and may ultimately set the stage for a more serious attempt to orchestrate interagency cooperation for ecosystem rehabilitation. Section Four details the procedural requirements of interagency cooperation and Section Five, the conclusion, suggests a role for Environment Canada in promoting and implementing cooperative structures and programs.

This study draws from three sources of information: (1) interviews with 24 academics and government personnel with experience with integrative environmental planning, at both provincial and federal levels; (2) an introductory review of interagency theory; and (3) a workshop held for selected academics and government personnel on the possibility of cooperating to rehabilitate the Toronto aquatic ecosystem. These information sources are further described in Appendices 1,2 and 3, respectively.

1.0 The Structural Blocks to Interagency Cooperation

1.1 Agency and Interagency Structure

"Bureaucracy, as a form of organization, is the most powerful instrument yet developed for getting people to work together on monumentally large, common tasks. Modern bureaucracy harnesses more power than any, and perhaps all of the great projects of antiquity ... it makes possible, the control of literally millions of people" Hummel 1982, p. 25).

There are many theorists of bureaucracy who believe that the structure capable of organizing such large groups of people in the delivery of predictable services, is also responsible for many of its problems.

As defined by the now familiar Weberian model, bureaucracies have the following structural characteristics (Britan 1981): most importantly, their operations are well defined; encoded into tasks which are transferable without major adjustment to the subsequent holders of each position. Authority is explicitly hierarchical and administered through similarly well-defined controls. Work responsibilities within this hierarchy are divided into orderly spheres of competence and responsibility, and employees interact primarily through these specified roles. Bureaucracies are therefore structured to be reasonably independent of personalities: individual personal values, behaviour patterns and relationships are not meant to significantly shape the work environment. Those in bureaucracies are meant to see their positions as full-time careers, to be hired on the basis of professional criteria, and to be able to advance in the administrative hierarchy. While these characteristics are, in fact, clearly tempered by the personalities and relationships of the individuals which create these structures, this model does have two widely validated attributes:

(1) Departmental Autonomy

The division of labour described above results in a large number of specialists whose work encompass small portions of larger programs. To complete these programs, the help of other specialists and the coordination of managers is required: a relationship with a control structure bonding departmental employees into internally focused,

interdependent teams. The internal focus results from the importance of internal reporting relationships; individuals are responsible directly to their managers and only indirectly to their clients and the public. While decision-making among most who function within this structure may be restricted, the autonomy of the unit as a whole tends to be high and highly valued.

(2) The Element of Self-Interest

Organizations with strong internal and relatively weak external connections cannot help but be primarily concerned with internal well-being. Decisions to become involved in particular projects will therefore rest on the perceived relationship of these projects to internal agency goals. If project benefits lay outside the existing agency goal structure, either fully or partially, then agency participation in that project will necessarily be a subject of administrative debate.

This brief description of bureaucratic structure sets some of the most important conditions for interagency cooperation. The strong internal pressures to meet agency goals often allows little freedom, funds and accords few rewards to interagency cooperation. Agencies vary in the strength of this internal focus, of course; it does not appear to be a constricting feature for Environment Canada. Strategies to address this component in other agencies usually centre on careful attention to the benefits received by agency personnel of their involvement in interagency programs; these will be detailed later.

1.2 Fragmentation of Jurisdictional Responsibility Among Autonomous Units

For historical, political and technical reasons, no single agency or level of government has full responsibility for environmental management. As a result, jurisdiction is fragmented among many agencies, and depends

upon different enacting legislations and mandates with a bewildering assortment of varying powers. This fragmentation is documented in public service systems generally and is usually formally defined as: "a division of responsibilities among multiple separate agencies, each having a unique purpose, but lacking a coherent policy or integrated direction" (Rogers and Mulford 1982).

In many cases, confusion exists about which agency or level of government actually has jurisdiction (or wishes to accept jurisdiction) over new problems. As these problems develop and their implications spread, jurisdictional responsibilities may proliferate. In other cases, there is existing but overlapping jurisdiction which may lead to disagreements and defence of 'jurisdictional turf'. An example of this occurred when the federal and Ontario governments each claimed the other was responsible for the regulation of mercury pollution in the English-Wabigoon river system (Estrin and Swaigen 1978). Finally, in certain instances tensions arise where the Federal government has jurisdiction but has given regulatory implementation to the provinces and the two levels are in disagreement over aspects of that regulatory activity. All of these problems can and do create tensions and delays in the development and implementation of environmental regulations, until clarification and agreement are reached among the government agencies involved.

Some of these problems are discussed in Environment on Trial (Estrin and Swaigen 1978). As indicated, environmental issues are particularly susceptible to dispute since it is often the case that definition of "the problem" entails definition of who is responsible. "Problems" may appear to the public or concerned interest groups as naturally belonging to an agency that does not in fact have that "problem" as part of its current mandate. This is complicated when the surficial aspects of the problem do fall within one mandate, but the mechanism which must be engaged before a real solution can be found are within the perview of another mandate.

All of these conditions are mirrored in the Keating Channel dispute, where definitions, jurisdictions, mandates and public perception altered kaleidoscopically over time. In a case like the Keating Channel, a solution may be discovered in a previously unheard of quarter, and the rest of the parties involved may latch on to it in relief. Such reactions indicate that the managerial environment is quite turbulent. They also indicate that it is at these times when imaginative attempts at redefining the solution or introducing a new conceptual framework may find a hearing.

1.3 Conflicting Interests

Having illustrated that bureaucratic structure produces independent units, Yarborough (1984) and others argue that the values underlying the policies of these independent agencies are as diverse and conflicting as those in society at large. Political pluralists have demonstrated that the political arena is a battleground for groups promoting different and conflicting priorities for public spending, and that these groups have organized themselves to work with (or against) the present bureaucratic structure (Stone 1978). Each government department, supported by a range of non-governmental groups, reflects to some extent, the values of those groups. Policy differences are therefore often value-based and as such, difficult to resolve procedurally, since the prevailing public decision-making tools (cost-benefit analyses) are not designed to resolve value differences.

When value differences are entrenched in clear legal mandates (e.g. the wetlands drainage mandate of the Ontario Ministry of Agriculture and Food, under the Drainage Act, versus the wetlands preservation mandate of the Ontario Ministry of Natural Resources; and in the same ministry, MNR, resource development conflicts with habitat conservation), then mechanisms must be found to resolve or more often, avoid, direct conflicts of interest. It is these cases where the relative political strengths of prevailing social values, particularly as they are represented in Cabinet, are most apparent. And it is these cases which show most clearly the difficulties with consensus-building as a method of interagency conflict resolution.

Many environmental interests are broad and long-term, and difficult to articulate. They stand little chance against strictly defined, short-term, or long-standing historical mandates inherited from the past, particularly when those mandates involve more powerful economic concerns. In addition, the interests of one section of an agency may coincide with one section of another agency, both of which might together succeed, but separately fail. Environmental agencies could therefore clearly benefit from procedures designed to overcome the stalemates and outright uses of political power which often characterize interagency interaction, procedures which will be discussed later in this report.

1.4 Leadership and the Structure of Cooperative Decision-Making

As the previous discussion and the Keating Channel case study illustrate, cooperation between autonomous agencies often requires a formal management structure to be successful. Without a lead agency, confusion over jurisdictional responsibilities, data, power imbalances, or any other of the 'blocks' to cooperation identified here may make consensus impossible. Without a lead agency, as well, impetus for moving on the problem may not exist.

The range of possible interagency coordinating structures (with and without a lead agency) is outlined in Section Four. Suffice to say here that leadership in some form is usually one of the most important prerequisites to successful cooperative problem-solving.

2.0 THE POLITICS OF PUBLIC PARTICIPATION AND DECISION-MAKING

Organizational theory and the assessment of organizational structure and function is only one method of explaining the events of case studies such as the Keating Channel and the general phenomenon of interagency interaction. Although this method will be the focus of this report, it must be mentioned that a second and ultimately more powerful set of explanatory concepts exist and those are the concepts related to the use of power itself. Much of the dispute which arises in this area can be traced to disagreements about the power which is and should be invested in the major decision-making actors; elected politicians, government officials and the various categories of organized and unorganized publics. Canadian democracy is, by and large, a representative rather than a participatory form of government, and although the theory of representative democracy places the responsibility for decision-making into the hands of those directly responsible to the electorate, the increasing role of government bureaucracies in making decisions by creating policy and legislation has been a concern for decades. Government function has traditionally been (some would say undemocratically) closed to public scrutiny and involvement; the more functions delegated to government therefore, the more its officials have been questioned as to whether they are defeating the objects of democracy (Albrow 1970).

Public officials wield power by influencing decisions before they are made politically in two ways: by giving advice and by sifting information. Officials characteristically define both the problems and their range of practicable solutions. Further, the decision, having been made legislatively, may formally confer wide discretionary powers upon those who implement it, or it may be sufficiently vague as to be open to a wide number of interpretations. These powers exist at all government levels and have received, in the environmental field, substantial criticism for their part in keeping the development of legislation firmly out of the reach of the public, no matter how well informed they may be (Schredker, for the Law Reform Commission of Canada, 1984).

Interagency interaction then, just as single agency function, has a particular reciprocal relationship to its socio-political context and cannot be realistically assessed without reference to this relationship. Although such

an assessment, including the barriers erected and the opportunities provided for public participation by Environment Canada is outside the present study, it is essential to the development of interagency interaction procedures.

The role of public participation can be determined from an organizational perspective, as well, however. Models of organizational decision-making are many (Grizzle, 1982 lists 12 and develops another herself); but most of these are designed for single, non-governmental organizations and therefore accommodate little participation from non-members (ie, members of other organizations or the public). Further, it need hardly be said that decision-making in governmental organizations is rarely a model process: the difficulties of concurrent decision-making at the political, administrative and functional levels and the subtle tailoring of perspectives and options as information-passes between them are unlikely to be rationalized in print. The Keating Channel case study contains some classic examples of delicate manoeuvring and disharmonies between decision-making levels.

For these and other reasons, the model which best fits governmental organizations and particularly interagency decision-making is that related to turbulent environments (Emery and Trist 1973). Times of turbulence or uncertainty (change, stress or crisis) are often times when organizations cooperate to survive. Moreover, these conditions appear to be replacing the stable economic and political conditions which initially gave rise to the linear, predictive models at the core of classic organizational theory. The most basic strategy for coping with uncertainty is the accumulation of as much information as possible at the beginning of the process and the development of flexible modes of action on its basis. The maximum involvement of public groups during the initial stages of problem formulation is the only way to accomplish this and is, in fact, a primary tenant of public participation programs. The aim of both is the early identification of all important issues and concerns, including the need for education to allow all public groups access to decision-making power, and the development of adaptive capabilities in government agencies to respond to the evolution of these concerns.

3.0 THE AVAILABILITY AND INTERPRETATION OF DATA

Data is listed here as a separate concern because its limitations and inadequacies reflect upon and influence both the organizational and the political aspects of interagency function. Data gaps and conflicts, conflicting interpretations of data, conflicts over what and whose data should be used, and scientific uncertainty over the significance of data, may all delay or block agreements on environmental problems. These concerns about data are not limited to governmental agencies but to all parties involved. In some cases, they are legitimate; but in others, one or more parties may use them as an excuse to avoid reaching an agreement or proceeding with action on the issue at hand. Until there is clarification and agreement about data, the resolution of the environmental problems will be blocked.

As with jurisdictional issues, the conflicts over data gathering may proliferate as the problems complexify over time. Design of data gathering systems and monitoring procedures can become the centre of agency disputes, since such systems and procedures rarely can be all things to all people, nor can they often be altered to cope with altered needs. This can be exacerbated by the response of the public towards data gathering programs implemented without consultation. Issues involving risks, and translations of complex scientific research programs into comprehensible forms are extremely sensitive, and can present the spectacle of agencies agreeing in private on conclusions, but disagreeing at public tribunals over methodologies and implications.

4.0 THE SOCIAL CONTEXT OF INTERAGENCY COOPERATION

Agencies do cooperate of course - both officially and unofficially - but the problems identified above form the conditions under which cooperative efforts must be organized. These conditions developed as Western governments expanded to meet the needs of the modern welfare state. They have been shown to be closely linked to prevailing ideologies of economic, political and social service functioning; that is, the context for the development of cooperative management ideologies is nothing less than the complex of social forces acting in society at large. These developments in American government are organized by Rogers and Mulford (1982) into four distinct phases.

During the period from 1850 to 1930, a Utilitarian model rationalized the formation of individual competitive agencies. This model, structured by values of economic freedom, private property, freedom of contract and individual self interest, allowed for little coordination. It might be said that the model provided little encouragement to work against the structurally-based tendencies for agencies to operate individually.

By 1930, the ability of competition in a free market economy to deliver social goods was in serious doubt and the ethic of individualism was beginning to be replaced by a concern for social welfare. Roosevelt's New Deal placed the responsibility for social well-being squarely in the hands of government, and agencies, public and private, grew to meet the demand. Managerial ideology began to address the growing need for service coordination. The period from 1940-1960 is labelled by Rogers and Mulford (1982) as the Altruism model and it developed along side of rather than in place of the older competitive model. The Altruism model stressed normative rather than economic motives for the development of cooperative structures. Teamwork and resource sharing are argued to have been rationalized during this period on the basis of moral obligation to common purposes. Whatever the case, emphasis in management shifted from efficiency of a manageable number of agencies to accountability, continuity and accessibility of services in a highly complex and fragmented bureaucracy.

The extent of this complexity and fragmentation initiated a new concern

for control. The period between 1950 and 1970 has been described by Brilliant (1973) as the corporate or managed economy, and it was one where centralized authority was increasingly extended over government agencies. Social service programs continued to grow and expand at both the federal and state/provincial levels, overshadowing and often encompassing the voluntary and private sectors. Techniques to manage this unwieldy structure, which were often borrowed with little change from defense and natural resource agencies, shifted emphasis to the division of labour, establishment of rules and clear lines of authority, and the coordination of activities. Within the centralization paradigm, coordination was intended to integrate services and often took the form of joint policy-making among interdependent units. The creation of new administrative relationships among related agencies - public and private - was seen as a mechanism for eliminating fragmentation, gaps in services and unnecessary duplication, and for enhancing service delivery. These relationships were horizontal, cutting across functional lines at a supra-agency level. Coordination was often promoted by a designated individual: government executive, board member, staff member or individual citizen. For the reasons listed in the previous section, however, few of these attempts at coordinating autonomous agencies through super-imposed administrative structures showed any real signs of success.

As problems increased with service integration and the management of large, fragmented bureaucracies in the 1960's, the non-government public began to voice their anger about the disparities between their needs and the government programs. Individuals who had not felt the benefits of assistance began to unite into powerful lobby groups; neighbourhoods and professionals dealing with local problems (advocacy planners, social workers, community development officers) began to fight for local control. At the same time, psychologists, ethnologists and anthropologists, particularly, began to develop what is now a large literature on the humanization and democratization of the rational, mechanistic bureaucracy. Management ideology entered a "socio-political" era (Miller and Form 1964). Rogers and Mulford (1982) call this the public choice model, although the changes in bureaucratic structure and function brought about by these pressures were rarely translated into a working model.

In fact, none of the pressures for reform succeeded in transforming

government structure; rather, they were additive. Government today in the United States and Canada reflects all of these ideologies and practices:

- o competition between autonomous units;
- o altruistic attempts at cooperation for a more effective delivery of services;
- o rationalization into centralized bureaucratic structures; and
- o increased pressure for citizen control.

In Canada, the development of most environmental services occurred during the final period of publicly-oriented reform. The following section outlines the environmental influences on the creation of institutional structures, particularly those which integrate functions within and between agencies, since the context for cooperation among environmental agencies is created by the legacy of institutional and environmental management concepts. Section Four, which provides a detailed set of requirements for cooperative programs, then addresses each of the powerful social forces listed above, as well as the environmental management concepts introduced in Section Three.

SECTION THREE: THE ECOLOGICAL CONTEXT FOR INTERAGENCY COOPERATION

A brief review was just given to the institutional characteristics of and constraints to interagency cooperation. For environmental agencies, however, the prevailing professional opinion about techniques and concepts of environmental management has also influenced their current structure. Prior to the 1970's, that opinion supported the classic positivist approach to problem resolution. Problems, which were known to be extremely complex, were simplified for research purposes by further and further subdivision. The degree of specialization and sophistication of techniques needed to probe each fine question created a large number of specialists working in discrete sub-disciplines. A structure was ultimately established to research each environmental parameter individually, and to remedy associated problems one by one. The 1972 Canada-U.S. Water Quality Agreement reflects this concern for the management of individual pollution parameters, and its recommendations led to some substantial improvements in Great Lakes water quality.

These improvements were limited by the available reductionist management techniques, however; a fact which was recognized even as the Agreement was signed. By 1972, ecosystems were known to have an integrating capacity and a limited recovery capability which previous specialized techniques and vocabularies could not approach. Researchers began to bring back into use the original holistic perspectives which had structured the development of the discipline of ecology, to capture the ecosystem's integrative functions. They have been particularly active in the Great Lakes region, and have, in the past 15 years, produced a number of approaches to environmental management for all scales and degrees of urbanization⁽⁴⁾. The 1978 Water Quality Agreement recognized the validity of the holistic perspective by officially shifting its focus from water quality to whole ecosystem parameters.

(4) Lee, Regier and Rapport (1982) identified and compared ten of these holistic approaches to environmental management: International Joint Commission Research Advisory Board (1978), The Ecosystem Approach; Leman and Leman (1976), The Great Lakes Megalopolis; Great Lakes Fishery Commission (1979), Rehabilitating Great Lakes Ecosystems; Federal-Provincial Strategic Planning for Ontario Fisheries; International Joint Commission/Science Advisory Board, Ryder (1979), Ecosystem Objectives for the Laurentian Great Lakes Based on the Fundamental Requirements of the Lake Trout; Ian McHarg's environmental planning method as demonstrated in the Toronto Central Waterfront Planning Study; International Joint Commission/ International Reference

Characteristics of the ecosystem approach centre around ecological phenomena rather than the conventional and historically dominant political, engineering, economic or accounting perceptions, and include the following:

- o spatial boundaries within which management plans are formulated which reflect some aspect of ecological integrity;
- o a balanced, integrated combination of mapping, monitoring, modelling and adaptive management case studies to convey, analyze and update ecosystem information;
- o cohesive, self-regulatory structure and function of ecosystems involving stable phases or states of equilibrium, and thresholds or limits of stress tolerance of those states; and
- o ecosystem response to (ie, change from) human activities, with responses to different uses often interacting synergistically (Lee et al 1982).

The political and administrative processes of relevant government agencies must also include:

- o the active involvement of a broad representation of ecosystem users;
- o a range of legal and economic mechanisms to reduce user stresses; and
- o regular and critical reviews of the planning, regulatory and budgetary functions of all agencies involved in the management of the ecosystems (Lee et al 1982).

These functions clearly strain existing government structures, resources and accepted practices. Their implications for policy development and management structures and techniques are still not fully understood, but they do imply at least the following:

- o Jurisdictional boundaries must be merged to create biological boundaries, within which agencies must act cooperatively;
- o As managers begin to shift focus from single species and water quality parameters to whole ecosystems, management styles must become more experimental and flexible, responding quickly to changes in environmental conditions;

(4) continued: Group on Great Lakes Pollution From Land Use Activities (1972-1978); Environmentally Sensitive Area Planning in Ontario; Great Lakes Basin Eutrophication Models; and Rapport and Friend (1979) and Rapport and Regier (1980), The Stress-Response Environmental Information System.

- o Goals must be set for the quality of the whole ecosystem, not just for selected parameters;
- o Data on ecosystems must begin to describe the limits to which they can be stressed before their capacity to recover is exhausted; and
- o Existing data on fragmented aspects of ecosystems, collected and held by different agencies at all government levels, must be pooled and integrated.

2.0 ECOSYSTEM REHABILITATION WORKSHOPS: SPECIFIC APPLICATIONS OF THE ECOSYSTEM APPROACH

One of the Ecosystem Approaches mentioned above is now in use by an inter-university group in Canada and the United States, which has been funded by the Great Lakes Fishery Commission and several private foundations to carry out practical test projects (5). Since 1979, these projects have taken the form of workshops in Long Point Bay, Lake Erie and Green Bay, Lake Michigan, which gathered together all interested agency representatives and public interest groups in several "think-tank" sessions. Their aim was to interest ecosystem managers and agency administrators in developing shared goals for ecosystem rehabilitation - a project which had formerly been outside both legislation for environmental protection and agency mandates for environmental management. Although the specific focus of the workshops was the development of ecosystem management guidelines, the processes of assessing data, identifying agency mandates, setting system goals and establishing important ecosystem "stresses" (human uses which interfere with natural ecological processes) tended to perform interagency coordination functions.

With the Green Bay and Long Point workshop experience as a guide, the authors held a similar workshop to discuss the feasibility of rehabilitating the Toronto aquatic ecosystem in August, 1984. Its purpose was to assess the usefulness of the approach as a method of establishing interagency linkages and eventually, permanent coordinating committees. The particular form which the approach would take for the Toronto aquatic ecosystem is defined by Figure 1: the test case outline. Its potential for structuring interagency cooperation lies in its identification of the problem responsibilities and mandates of each participating agency, and its assessment of the resultant gaps, overlaps and conflicts. Results of the Toronto workshop are appended to this report (Appendix 3). The ability of this project to coordinate agencies which manage Toronto's aquatic ecosystem so that larger rehabilitation goals, formerly out of reach, could be attempted by the interagency team, is yet unexplored. It is one of the major recommendations of this report that the project be continued, with Environment Canada's support.

(5) The core members of this group are: G.R. Francis, University of Waterloo, J.J. Magnuson, University of Wisconsin-Madison; H.A. Regier, University of Toronto; and D.R. Talhelm, Michigan State University. Their major publications include Great Lakes Fishery Commission Tech. Repts. No. 37, 38, & 39.

FIGURE 1:

TORONTO WATERFRONT WORKSHOP: IS REHABILITATION POSSIBLE? AUGUST 9, 1984

Will the ecosystem approach work as a strategy for rehabilitation of the Toronto watersheds and waterfront?

TEST CASE OUTLINE

1. Define the most important parameters:
 - flow/storm-flooding
 - sediment/turbidity
 - nutrients (BOD)
 - bacteria
 - organics
 - inorganics
 - structure of the aquatic communities
 - etc.
2. Discuss the state of present monitoring data and knowledge about these parameters as well as the history of the aquatic communities.
3. Identify the causes of the present levels of degradation (stresses):
 - instream erosion/ overland sheet erosion
 - combined sewers
 - inadequate STP treatment levels
 - shoreline restructuring
 - dredging
 - etc.
4. Develop a list of secondary considerations or transport mechanisms which modify the initial stresses (ie, follow them through the ecosystem)
5. Priorize the stresses as to their significance in ecosystem degradation.
6. Draw up an interaction matrix, relating the stresses to each other.

7. Identify the groups of stresses which interact, and which would have to be considered as a unit for management.
8. For each stress group, list rehabilitation methods which should be seriously considered, including those both structural and regulatory.
9. Identify the agencies which must be involved in designing feasibility studies for alleviating each stress group. What role public involvement?
10. Ecosystem goal-setting: once the feasibility of various management strategies is known, how should goals for ecosystem rehabilitation be set? Who should be involved: agencies and the public?
11. What are the jurisdictional problems involved in #s 9 and 10?
12. What forms of conflict will arise? What forms of conflict resolution might be appropriate to consider at each stage?
13. What kind of integrating mechanism seems appropriate for the inter-relation of problems and hence, management strategies: an interagency committee? one particular agency? something else?
14. After this exercise, how effective does the ecosystem approach seem for the resolution of aquatic problems in Toronto?
15. And finally, what role would Environment Canada have in the process? (or range of roles could E.C. have?)

3.0 IMPLEMENTATION OF AN ECOSYSTEM APPROACH: PROGRESS TO DATE

The legal basis for an integrated ecosystem approach is already in place in Ontario. At the broadest scale, the 1978 Great Lakes Water Quality Agreement, as mentioned, has adopted an ecosystem perspective to Great Lakes management. At the political and senior management levels, the policies of both Environment Canada and the Ontario Ministry of Environment, as well as the Canada-Ontario Agreement provide a framework for interagency cooperation in the achievement of whole ecosystem goals. Environment Canada has further developed the approach into a strategic plan for the management of Great Lakes resources. Agency members interviewed felt that the approach was evolving, as its use, however limited to date, became more entrenched in the thinking and actions of government officials and public interest groups.

The most important means for facilitating the evolution, however, was universally considered to be its use for the management of specific problem ecosystems. While interagency cooperation in the management of whole ecosystems is increasing, it has not yet reached the state of comprehensiveness defined by the Great Lakes Ecosystem Rehabilitation Workshops. The Ontario Ministry of Environment and the regional conservation authorities have been increasingly planning for watershed management, for example (eg. the Thames, Grand and Avon watersheds). In some cases, land and water uses were assessed and incorporated into the exercise. A similar effort was initiated by the Canadian Wildlife Service for Big Creek Marsh, on Long Point, Lake Erie. These "partial ecosystem approaches" are initiated more by the particulars of each management situation than by explicit policy, however, but they do reflect a general awareness of the interaction of problems and the potential of interagency cooperation to save time and money.

Other examples of modified ecosystem approaches are the environmental planning and regulatory processes carried out for the Nanticoke Industrial Complex (Nelson et al 1980), the flood control planning program for the Sturgeon River/Lake Nipissing/French River area, and in general, the regional planning processes carried out in Ontario. While these processes clearly have deficiencies, they are symbolic of the acceptance of comprehensive environmental planning at all government levels.

The provincial Environmental Assessment Act is potentially a powerful tool for comprehensive planning, as well, as is the federal EAR Process. The Keating Channel EA, in fact, used stress ecology as the basis for its assessment of aquatic resources and their potential for rehabilitation. The use of sound ecological theory in EAs is, unfortunately, completely at the discretion of the scientific advisors for each process. Neither of these processes (federal or provincial) is used sufficiently often to make it an important vehicle for the ecosystem approach, however. Since both are undergoing review at the moment, it would be very useful to examine their roles in the approach (potential and actual) in greater detail.

Signs of the increasing viability of the ecosystem approach are the use of more personnel in horizontal, integrating functions and the growing recognition of the importance of adequate public participation in environmental planning. Many of the examples listed above illustrate these trends. What has not yet occurred, however, is the use of an ecosystem approach in its fullest form, that is in a rehabilitation program on the broadest scale, where all stresses are identified and included, all jurisdictional gaps and conflicts identified, and all data needs and conflicts identified as well. The general acceptance of the conceptual approach seems to be occurring with its use in a modified, lesser form. Any further advances in acceptance of the complete approach await the successful implementation of a demonstration project to assure those with doubts that the project is practicable and cost-effective.

4.0 THE ECOSYSTEM APPROACH: PROBLEMS AND ISSUES

Where the scale of the ecosystem is large and/or the number of interests and agencies involved is also large, the use of an ecosystem approach can exacerbate the problems outlined in Section Two:

- o Clearly, there will often be more jurisdictional issues, more data problems and a greater number and range of conflicting interests;
- o These can only produce even greater time requirements for resolution;
- o The complexity of the process and number of interests involved increase the need for horizontal, cooperative structures within and among agencies;
- o There will be an even greater need for the expansion of opportunities for public involvement and particularly, for education;
- o Political decisions that circumvent regular management channels will often negate the proper functioning of the approach;
- o The more complex the process, the more important will be leadership to initiate and guide it; and
- o Finally, the long term nature of the ecosystem management process will require adaptation to changing control structures.

There will be a number of additional problems and issues as well. The approach clearly creates more difficulties for development-oriented agencies and for private developers than for environmental agencies. Private developers and industry are currently dissatisfied with the cumbersome, costly, and time-consuming nature of many regulatory processes. Provincial agency members, further, believe that they do not have the resources of money and manpower to tackle planning on the ecosystem scale. They are therefore unlikely to adopt the approach without resource assistance or strong political pressure. And, finally, many proponents of the ecosystem approach perceive that it will not be viable until all social groups can agree on the value of ecosystems and cooperate in their management; that is, until consensus management at a very large scale becomes feasible. Although this may be desirable, and even possible in some situations, the existence of conflicting interests need not inhibit the implementation of the approach. Conflict resolution techniques exist, which are discussed in Section Four, which may bring about successful resolution of seemingly intractable problems.

Formal structures for dealing with these difficulties are discussed in the following section.

5.0

ADVANTAGES OF AN ECOSYSTEM APPROACH

1. The most compelling advantage is the potential for saving money in an era of spending restraint. The ecosystem approach provides a method for identifying the connections between problems and the effects of each management endeavour on the entire problem constellation. Interrelated problems may then be dealt with at once; the solution to one problem preventing or reducing others. This may allow issues of less public concern to be "piggy-backed" onto issues with higher public profiles and therefore to be remedied more quickly and cheaply than would otherwise be the case.
2. The approach can be used to produce ecosystem models without progressing to the management strategy stage. With jurisdictional, data and interest issues defined, the models could be useful tools for the resolution of problems as they arise over time. Much time and money could in fact be saved for both private interests and government with the model in place. This would hold true if the process progressed further, as well of course. In either case, the approach would initially require more time and resources to put into place, but would provide substantial savings in the longer term.
3. By providing a method for identifying the agencies and data necessary for each management problem, the approach identifies the difficulties with each at the outset. In fact, it can be argued that the resolution of these difficulties (conflicts in interests or data interpretation, jurisdictional confusion) would be necessary for the continuation of the planning process. Once these issues have been resolved, they also allow related issues to be clarified much more quickly in the future.
4. By encouraging participants of the process to (a) form the broadest construct of the situation (or problem constellation) from the beginning, and to (b) translate this information into a basis for

flexible action; the ecosystem approach prepares them best for environmental uncertainty. These features form the core of classic strategies for decision-making in uncertain or turbulent environments (Emery and Trist 1973), and should be interpreted here as including maximum public participation in the initial problem definition phase. Only by including as many as possible of the sources of issues and information will participants be able to anticipate and prepare for problems as they arise.

5. It is a process which demands agreement on a goal: this may be an opportunity to raise the issue to the level of political discussion necessary to allocate funds for major projects. It is also an opportunity to get public and regulatory agencies together to achieve a better understanding of what is possible and what is desirable.
6. Having set goals which cannot be met without horizontal integrating structures, the approach may then serve as a catalyst or perhaps a forcing mechanism to improve or create these structures. Without such goals, the driving force for these changes may not exist.
7. Management situations which demand horizontal consensus, such as setting of goals and strategies, could then be structured so that informal discussion led to formal conflict resolution, if that informal discussion created a deadlock.
8. And, finally, perhaps the most important aspect of the ecosystem approach as yet undiscussed is that it provides a justification for bringing together a group of potentially conflicting "interests" and, through its normative process, transforming those interests into common or agreed-upon goals. As has been amply demonstrated throughout this paper, the world of interagency conflict and resolution -- both on the "ground" and in the literature -- is one in which interests are primary. These interests may be encapsulated in the legislative mandate of an agency, its particular "turf", or in terms of the

audience it seeks to address. In addition, only the most naive of observers would assume that agencies do not have internal interests of their own.

However, to speak of nothing but "interests" and to define all innovative solutions in ways that might balance or resolve conflicting interests, misses one of the central shifts that the ecosystem approach allows a management agency to make. Although the relevant agencies may be drawn into a negotiating process in order to further their own interests; as soon as they become involved in what is, after all, a normative process -- working towards a benign environment -- the very approach begins to undermine narrow interpretations of "interests".

This is of particular relevance for an agency like Environment Canada, whose strongest mandate is to look after a "general interest". This is often seen as a hindrance, compared with the strong line functions or more narrowly defined mandates of other ministries. While it may be, in many circumstances, in many others the hindrance is only there because Environment Canada has not seen the possibilities inherent in using its broad mandate as a way both of assisting other agencies to attend to their interests, and of using those interests as a mechanism for furthering Environment Canada's own broader agenda.

The ecosystem approach is one such mechanism, and one that is perfectly natural for Environment Canada to invoke. By asserting the need to look at certain problems ecosystemically, both Environment Canada and the relevant agencies can use the complexity of the issues and the need to set long-term goals and objectives to give themselves room to manoeuvre. Even more importantly, public pressure as expressed in the "general interest" to solve environmental problems can be translated from individual "interests" to general solutions. Any agency that is obstructive can be threatened with the collapse of the process, and a return to the chaos that prompted the parties to get around a table in the first place.

Quite deliberately then, the ecosystem approach redefines the issues in such a way that each participant comes into the process in order to solve a particular interest or problem, and harnesses that through the way it addresses the entire situation. The result, hopefully, is that all or most of the individual interests are met through the promotion of the general welfare. It is in this way that the physical understanding of the system, the array of agencies involved, and the improvement of the environment can be mutually reinforcing and mutually supportive.

SECTION FOUR: A COMPREHENSIVE ECOSYSTEM APPROACH:
WHAT DOES IT NEED TO SUCCEED?

An ecosystem approach to environmental planning seems not only necessary but inevitable at this stage: can its proponents overcome the existing fragmentation, conflict and power of sectoral interests to implement the process? We suggest that they can as long as the following conditions are met:

1. Motivation to act must be present.
2. A mechanism for involving the relevant agencies and ensuring their cooperation must be created.
3. A mechanism for conflict resolution must be chosen.

This section is a compendium of cooperation techniques. Rather than a prescription for the orchestration of an ecosystem approach, it should be regarded as an outline or guide to the general problem of interagency cooperation under conditions similar to those faced by environmental agencies in Ontario. That is, in situations where agency autonomy is high and will remain so, and where the development of formalized cooperative structures is in its infancy. The design of particular strategies for the cooperation of particular sets of agencies, such as those operating in the Toronto area, may take advantage of the suggestions offered here, but must be regarded as a separate process requiring a great deal more situation-specific information than is provided in this report.

1.0 MOTIVATION

It is generally agreed that without the benefit of compelling legislation, the implementation of cooperative environmental planning will likely require a catalyst which affects all of the relevant agencies in nearly the same way. Further, each of the agencies required for plan or project implementation must see tangible benefits from involvement, although these benefits need not be the same for each agency.

The motivation to act can, and some believe must come from outside government agencies, that is, from pressure groups, academics and non-governmental institutions. In general, the political will to act on problems which are difficult and expensive such as current highly degraded ecosystems, will not be strong without the pressure of public concern. In the Toronto area, for example, general public awareness and concern about the aquatic ecosystem is low, although pressure has been generated in the past to act on certain specific issues, such as water quality and beach contamination. Political pressure can be created most expediently by publicizing the issues of highest concern, including the former, as well as waterfront development, public access to waterfront parkland, the future of the Leslie Street Spit and the contaminant levels in sport fish. Public concern may also be created over issues which currently have a low profile, such as urban fishing, to focus greater attention on the quality of the water and the fish catch. In as many ways as possible, water and waterfront users must be made aware of the current state of degradation and the possibilities for improvement, and must come to see a healthy ecosystem as a possibility and perhaps, even a right. It is difficult to imagine that the financial resources necessary to begin these improvements will be allocated for environmental projects without a number of these very strong lobbies. Appendix Three outlines suggestions for the development of rehabilitation pressures and tactics in greater detail.

In this regard, it is not possible to overstate the need for education, both of the public and of politicians at each government level. The creation of a sense of urgency for environmental issues will remain one of the most important tasks for all those concerned about environmental quality, governmental and non-governmental alike.

2.0 A MECHANISM FOR INVOLVING THE RELEVANT AGENCIES AND INSURING THEIR COOPERATION ONCE THE PROCESS HAS BEGUN

It is generally perceived that, for the ecosystem approach to be accepted, all of the parties with interests in the ecosystem must be convinced that it is the best method for dealing with their concerns. The approach must therefore be clearly understood by both senior management and working levels of government and industry, by politicians, and by the public, and must be "sold" to each on its own terms (financial and other). This will take time and experience. The rehabilitation of the Hamilton Harbour, for example, might be focused on urban re-development with its attendant jobs and financial benefits. A rehabilitated harbour would be one of the necessary components of the re-development plan.

These parties and their most common concerns have been separated by Rogers and Mulford (1982) into four groups:

- (1) Administrative groups: those who perform vertical management functions for each participating agency.
- (2) Support groups: those with primary fiscal responsibility.
- (3) Coordinating groups: those performing horizontal coordinating functions within and, most importantly, between agencies.
- (4) Demand groups: public groups who respond in some way to environmental protection and management policies.

Each group has a different perspective on the need for and results of the ecosystem approach; suggestions for making the approach "workable" will therefore be given for each group separately.

2.1 Administrative Groups

The administrative component of each agency is necessarily focused on that organization's survival and growth. Agency administrators and managers, evaluated in terms of the individual organization's success, tend to be primarily concerned with: organizational autonomy, resource investment and

public support. Their pressure to meet internal objectives is usually sufficiently strong that few resources are made available for interagency planning activities. Little time, energy and imagination therefore (tends to be) available for participation in cooperative activities (O'Toole et al 1972).

2.2 Support Groups

Support groups are those administrators and legislators whose primary concern is fiscal accountability. They either provide funds or are responsible for their use, and tend to be more interested in demonstrating that they have been used wisely than in the details of the projects themselves. Their interests tend to be with the most general accounting parameters: efficiency and general indications of program success.

Because both the administrative and support groups are concerned primarily with the operation of the specific agency under their control, their willingness to cooperate in activities which have extra-agency functions (ie, integration) will usually depend on the favorability of the activities' cost/benefit analysis (ie, the greater the benefits to their agency, the greater the chance of cooperation). Specifically, the project will be looked upon most favorably if it meets their agencies special needs and poses no threat to its jurisdictional domain.

These groups are more likely to be predisposed to cooperate if certain environmental conditions or internal attitudes exist:

- o a threat to their agency's survival. Threatened with loss of autonomy, manpower, budget, power and task domains, an agency "will freely and voluntarily search for other organizations that can help it reduce the threat" (Rogers, Whetten and Assoc. 1982, p. 54) (Aiken and Hage 1968, Black and Kase 1963, Benson 1975, Yarbrough 1984).
- o The chance to prevent or forestall a future crisis. Organizations will attempt to expand their power and resource base to bring the situation under control (Cook 1977, Yarbrough 1984).
- o They, themselves, hold cosmopolitan outlooks which value other sources of information and wider social goals.

Moreover, the less conflict inherent in the situation, the more likely cooperation is to be initiated and to succeed. While this seems rather obvious, the literature has defined a number of commonalities which give more substance to the statement. As more of the following characteristics are shared among key administrators in potentially cooperative situations, the more likely will be that cooperation:

- o similar definitions of the problem
- o similar values regarding its importance and a common commitment to its resolution
- o similar ideas about appropriate methods of problem resolution
- o common professional world-views among administrators and staff
- o high mutual professional regard among cooperators
- o status and competence of agencies must be perceived to be equal and high
- o the need for an immediate joint venture must be perceived by all

Cooperation will also be more likely by organizations which are internally structured to facilitate and promote group decision-making and external contact. That is when:

- o interorganizational contact is reinforced at the highest administrative level
- o staff are hired for cooperative programs who share the inclination and ability to do so, and
- o the prevailing organizational norms are those which reward rather than punish both cooperative efforts and collective approaches to problem-solving.

Clearly, these conditions will not be met under most circumstances. For the success of the ecosystem approach, however, it would be helpful to be aware of what might seem to be the obvious: (1) that the more conflict which exists among key administrators, the more powerful the demonstrated benefits of cooperation must be; (2) that the more compatible internal

agency operations are with cooperative planning (for example, the more internal reinforcement is given to personnel who facilitate interagency coordination) the more easily that agency will be integrated into the interagency planning process; and (3) the more short-term demonstrable benefits that can be built into project planning, the more political and fiscal support it will receive.

The previous set of internal conditions give rise to the third structural group in cooperative programs:

2.3 Coordinating Groups

Coordinating groups are those which cross internal line functions and agency boundaries to manage the system as a whole. It is these groups which were created for social service systems during the initial period of altruistic cooperation in the 1940's, but have yet to find the same function in the environmental field. These groups are primarily concerned with conflict resolution and obtaining consensus among member agencies; difficulties with mutual priority setting; managing the distribution of resources among member agencies to the benefit of the system as a whole; orientation of the system; and control of the central, coordinating unit.

The major concern of these groups, more specifically, is with the creation and maintenance of horizontal integrating linkages.

"Integrating linkages are mechanisms that maintain coordination by tying together or consolidating various administrative, fiscal and service delivery functions of the participant organizations." (Gans and Horton 1975). These may be:

- o programs and program development - most effectively coordinated by decision-makers at the upper management level;
- o resources (people, money, facilities);
- o the ecosystem itself; and
- o information - should be coordinated at all levels.

2.3.1 Forms of Coordination

It may be useful here to distinguish between cooperation and coordination. Coordination is usually the term given to cooperative programs which have formal recognition and receive some official support. Mulford and Rogers (1982) further define coordination as "joint decision-making and joint action in terms of phased task environments" (p. 30).

Coordination in the interagency literature has been used to describe everything from simple ad hoc discussions to formal participation on boards and committees. Forms which are unmanaged are of no use to the design of an interagency ecosystem approach. Those forms which are managed have been divided by Clark (1965) and Adams (1976) into three categories: mutual adjustment strategies, alliance strategies and corporate strategies.

- (a) Mutual adjustment: is defined as cooperation in the delivery of a service on a case by case basis without formal, cooperative goals. When common goals do exist, they are likely to be temporary (Haas and Drabek 1973). Rules tend to be developed as the interaction progresses, rather than at the outset, since most of the real decision-making is made by each independent agency. Strategies of mutual adjustment generate the lowest levels of collective identification. Lehman (1975) suggests that a lack of common source of identification and integration affords little motivation for acting in concert. Agencies in these situations have in fact been found to be oriented more to their own unit than to the larger system.

A strategy of mutual adjustment therefore seems unlikely to bring about the kind of coordination necessary for the ecosystem approach - although it clearly provides much of the unofficial agency support for such programs.

- (b) Alliances: Alliances are mechanisms to coordinate autonomous organizations without the authority of a formal hierarchy (Clark 1965). These strategies centre around some coordinating body: federation, coalition, board, council, central mediating authority, which creates rules for interaction and often commands the resources of a supporting staff. The degree of authority of

the coordinating body in relation to the autonomy of each member agency has varied widely, however. It may or may not have the authority to distribute shared resources and manage system goals. In social service systems, they have been given a range of functions:

- o evaluation and training
- o allocation of funds and provision of program direction
- o processing of information and development of recommendations but not the ultimate making of decisions
- o facilitation of the activities of several agencies, but not the decision-making affecting each one.

Decision-making in these social service alliances was therefore usually carried out by a process of consensus management, where no agency or agencies had the legislative or administrative power to force another to concur. Most participants found these processes to have: (1) been very slow; (2) led to discussion only of issues upon which consensus could be reached; (3) led to conflict resolution outside of the coordinating council or committee; and (4) a confirmation only of consensus issues. "On the whole, the organization of the (New York Health) Council worked against the setting of priorities because its major concern was the avoidance of conflict" (Rogers and Mulford discussing Mott 1968).

The ability of social service alliances to obtain system goals has been low, therefore, because each unit has had and maintained its own goals through negotiations with other units in the inter-organizational system. O'Toole et al (1972) in a study of the Cleveland Rehabilitation Complex, for example, found that the agencies were successful in promoting some of the common interests but when those didn't coincide with system goals, persuasion was the only (and relatively, effective) tool. This may not be an important barrier to the achievement of system goals if agency and system goals are shown to be compatible and perhaps even mutually reinforcing.

Alliance strategies appear to have the appropriate structure for interagency environmental decision-making but their lack of success in social service systems suggests that more attention should be given to the development of both agency-compatible system goals and system-compatible agency goals. This may be possible if the composition of the coordinating body includes upper management decision-makers, and staff with practical ecosystem experience at all critical times, or simply has sufficient upper management approval and support.

Yarbrough (1984) has in fact recognized that integration of the decision-making structure into the existing institutional structure is one of its most important prerequisites for success. Internally, this means that all agencies must agree and be willing to work within it. If a lead agency is designated, that agency must have the support of the other participating agencies. If a working group is established, that group must have within it, members who have authority to make decisions for their respective agencies.

All agencies or departments within agencies which are necessary for the implementation of the plan or project must be present. Further, the necessary funds must be allocated from member agencies or obtained from an external source. Externally, the group will probably not be successful without the support of politicians and the public. This may be embodied in a popular symbol ("Save the Whales" or "Save the Harbour").

In short, the organization set up must be tightly integrated into the existing planning/management/funding structure and must have:

- o political support
- o budgetary support
- o authority to make decisions
- o authority to implement decisions

The program must be stabilized so that policies can be sustained and implemented over time (Yarbrough 1984).

So far, we have been discussing the requirements of coordinating alliances on the explicit assumption that no lead agency exists. Management situations may arise where this is not true; an agency with clearly dominant authority and with which others agree to co-operate may exist, or alternatively, be chosen among member agencies to carry the leadership role. In situations where there are a cumbersome number of parties, it may be quite useful for the parties to appoint one agency to take a lead role, and to agree on limiting the number of parties at the table to a manageable but representative number. Other parties involved but not participating directly would be consulted on policy developments.

The designation of one lead agency and the entrustment of that agency with the responsibility for negotiating with the other agencies individually, leaves intact, the political relationships

between them. Agencies do not come to a bargaining table as equals, in other words; they undergo separate and unique bargaining agreements. The large literature on transactional analysis of planning processes (Munson 1977, Bacharach and Lawler 1980, for example), stresses the need for knowledgeable and cooperative personal relationships between interacting personnel in such cases. It also details the components of successful bargaining relationships. Munson (1977) outlines these most clearly:

If the agencies involved remain separate and independent, then "interorganizational planners must rely on personal interactions to bring the program to fruition" (p. 6). Planners in the lead agency must take the initiative to develop proposals from the implementing agencies which fit the collective goals as well as they fit the single agency goal. The planner must be flexible and willing to recognize that the implementing agency functions under specific constraints of capacity, capability and resources. If the planner is unwilling to accommodate these conditions, that agency is unlikely to continue to be involved in the effort. The conditions under which implementing agencies are most likely to stay involved are identified by Munson as:

- o early benefits for each agency expected to cooperate
- o direct benefit for both administrative and departmental levels
- o further benefits expected with continued participation, i.e. programming to achieve a continuous sequence of benefits
- o finally, recognition of the capabilities and constraints of the potential participants.

- (c) Corporate Structures: The final form of coordination which has been used to unify the services of social agencies is that of corporate hierarchy. Clear decision-making power is accorded to a central unit with authority over: (1) direction and administration; (2) joint budgeting, funding and purchase of services; (3) planning, programming and coordinating; (4) resource allocation; and (5) provision of direct services.

This structure, if effect, joins previously independant agencies into a centralized interdependant team and is therefore inappropriate for ecosystem approach purposes (where maintenance of agency independence is assumed).

2.4 Demand Groups

Demand groups are those who make their views on environmental issues known to government agencies; they are the groups and individuals whose consumptive and non-consumptive uses of resources encourage them to press for resource and ecosystem management and protection. As it has been practiced at Long Point and Green Bay, the ecosystem approach requires that such user groups be identified and included in the rehabilitation process, and an initial list of groups active in the Toronto area is provided as an example in Appendix Three.

"The public" comprises much more than simply the previously organized interest groups, however, and in fact, more than the organizeable individuals. Sufficient attention has not been paid, during the design of either the Long Point or the Green Bay ecosystem approach, to methods for educating and organizing the public; for helping them understand and identify with their natural surroundings. The means for accomplishing these goals could clearly fill another volume the size of this report, particularly since the uses of environments involve some of the fiercest of conflicts: for example, agriculture and wetland drainage versus wildlife and wetland protection; commercial, versus sport versus native fisheries; sailing versus power boating versus non-car usage of shoreline areas; and etc. Some of the aspects of public participation which are important to the conclusions of this study, however, are the following:

- o organized groups must be involved in the earliest phases of study definition;
- o a broad, accessible education program must be undertaken to raise general public levels of environmental awareness, to increase public pressure for environmental improvement, to identify as many as possible of the areas of concern to those who were not formerly involved;
- o methods must be developed to keep the better financed and organized interests from dominating the participation process;

- o methods must also be developed to integrate the participation process into the interagency decision-making process;
- o conflict resolution mechanisms must be chosen which are sensitive to the needs and limitations of all groups involved, both governmental and non-governmental.

2.5 Summary and application to the ecosystem approach

The degree of cooperation required by the ecosystem approach necessitates that a formal decision-making structure be created. This would probably take the form of an alliance of freely cooperating agencies, coordinated by a central interagency group or committee, and may or may not receive direction from a lead agency. The alliance structure requires that some form of consensus management be used to reach decisions, although Yarbrough (1984) has found that the need for consensus has undercut the potential coordinating power of the central committee. As he states (1984): consensus-building is more time-consuming and costly, both in terms of money and opportunities lost. "...The longer it takes the collaborative group to make decisions, the more likely it is that they will be made elsewhere". Further, the nature of the conflicts involved may preclude the successful operation of consensus management; that is, they may be sufficiently intractable as to require formal resolution or legislation. The relative strengths of the agencies involved (in terms of public support, breadth of mandate and predictability of funding) and the fragmentation of mandates may determine the most appropriate decision-making structure.

These problems with consensus management may be reduced by following Yarbrough's (1984) recommendations that the coordinating committee be given decision-making power and legitimized within both the institutional and the larger social contexts. This legitimization process, in Ontario, requires the combined advantage of horizontal interagency and interjurisdictional decision-making structures. At the federal level, the Priorities and Planning Subcommittee of Cabinet provides horizontal capacity, as does the Ontario Cabinet Committee for Resource Development and its provincial counterparts at that level. To be truly effective, however, the interagency and interjurisdictional structures should be combined at both senior management and working levels, and should be specifically focussed on environmental concerns. A senior management structure would provide overall approval and political support for ecosystem policies and management plans. Agreements are currently

made only on a case by case basis (eg, the Canada-Ontario Agreement on the Great Lakes).

Further integration of the coordinating structure and its processes could be achieved by staff development of ecosystem models, policies and management strategies, in conjunction with non-governmental interests. The range of governmental and non-governmental groups which could, and in fact, should be involved in this process, is large and includes educational, financial and municipal agencies. Internal conflicts within agencies which this integration creates could be resolved through integrated management: a system whereby agency divisions give prior notice to all other divisions before they proceed with plans so that conflicts can be dealt with before action takes place. The Ontario Ministry of Natural Resources currently uses this process.

3.0 MECHANISMS FOR CONFLICT RESOLUTION

So far, we have considered motivations and structures which offer the best chance of bringing about voluntary consensus in independant agencies. It will not always be possible to do this, and although environmental agencies in Ontario do not have a history of enforced or structured conflict resolution, methods for facilitating or speeding up this process will be increasingly necessary if interagency programs continue to be established.

Environment Canada has investigated mediation as a method for conflict resolution (most recently Schrybman 1984), but there are others with the potential to assist agencies through the ecosystem approach. Conflict resolution has been formally defined as "involving some sort of consensus building, joint problem-solving or negotiation which allows participants to advocate their positions directly to each other and find a practical, broadly-supported settlement of the dispute"(Bingham 1982). They include conciliation, joint problem-solving, facilitation, negotiation and mediation. All of these but mediation and conciliation generally occur before a dispute reaches an impasse or stalemate (Schrybman 1984). All are distinct from arbitration, where an arbitrator gathers facts and hears testimony from the parties in a dispute and then makes a decision which is binding; and fact-finding, which is a similar process to arbitration, except that the findings are advisory (Cormick 1980). None of these methods are relevant to situations where a lead agency has full jurisdiction, however, as they are designed to be used for parties of relatively equal power. The various forms of conflict resolution are further defined below:

Facilitation

This involves the use of an impartial person, acceptable to all parties, to "chair" or facilitate proceedings, by improving communication and focussing discussion. A facilitator would be most useful in the consensus management process, whether or not a lead agency has been designated.

Joint Problem-solving

Joint problem-solving is very similar to consensus management in its procedures and objectives. It focuses on planning processes and group dynamics rather than on negotiation. Again, this process has potential as a non-intrusive aid to consensus in decision-making.

Negotiation

A useful definition of negotiation is the following:

"Negotiation is a means of striking a bargain where the parties meet face-to-face to settle issues in which there is a disagreement. There is mutual commitment by the parties to seek a mutually acceptable solution by which they will be bound" (Cormick 1980).

Negotiation can be used at any time in the consensus management process when informal discussion and negotiation are perceived by the parties involved to be progressing inadequately. The appropriateness or success of the negotiation will not be affected by the presence of a lead agency.

Mediation

Mediation can be defined as follows:

"Mediation is a voluntary process in which those involved in a dispute explore and reconcile their differences. The mediator has no authority to impose a settlement. His or her strength lies in the ability to assist the parties to resolve their own differences. The mediated dispute is settled when the parties themselves reach what they consider to be a workable solution" (Cormick and Patton 1977).

There are a number of considerations that must be met for mediation to be appropriate: (1) Each of the parties should have enough power to exercise some sanction over the ability of other parties to take unilateral action. (2) Each of the parties must perceive the participation of all the other parties as legitimate (Cormick 1980). (3) The opportune time is usually when the issues in an environmental dispute have been defined, the parties to the dispute are visible and highly involved, and there is some sense of urgency - typically near the point of impasse (Cormick and Patton 1977).

Mediation can be useful for resolving specific aspects of a dispute. For example, it can be used to reach agreement on the interpretation of scientific data or scientific uncertainty, to look at legislative blocks to an agreement or to determine an implementation agreement for the settlement of and issue.

Environmental mediation has not been used extensively in Canada (Hausman 1982, Howare 1980, Schrybman 1984), and its use has begun only recently. One

important instance was the resolution of a long dispute between Manitoba Hydro, the governments of Manitoba and Canada and five Indian Bands. At stake was the flooding for hydro power of one hundred thousand square miles in Northern Manitoba (Mitchell 1983). Recently, there have been signs that governments in Canada perceive the value of mediation. Dr. Robert Slater, Assistant Deputy Minister of Environment Canada's Environmental Protection Service stated that Environment Canada should "encourage the consideration of mediation by those directly involved even when we ourselves are not" (Slater 1983). In Ontario, the Hon. Andrew Brandt, Minister of Environment suggested that mediation should be used to help resolve a conflict over the siting of a sanitary landfill in Simcoe County (Brandt 1983). Subsequently, the Environmental Assessment Board provided the services of a mediator to the parties involved (Schrybman 1984). In March 1984, the Ontario Premier announced that an experimental mediation process would be operated through the EAB (Schrybman 1984).

Conciliation

Conciliation is the attempt of a neutral party to reduce the tension and hostility among disputants, in order to open or reopen communication and to establish a dispute resolution process (Bingham 1982). It would be useful in the ecosystem approach to initiate some of the processes discussed above, or perhaps the consensus management process itself. A lead agency might be more likely to suggest conciliation than the other parties involved.

Arbitration/Fact-finding

Arbitration is highly unlikely to be used to resolve conflicts in an ecosystem approach, because its use would transfer decision-making power away from both senior agency management and elected representatives. Fact-finding on the other hand, might be very useful in breaking a deadlock, by presenting valuable solutions which parties could or would not derive on their own. The presence of a lead agency would not be significant.

In the Keating Channel case, facilitation, conciliation, fact-finding and even mediation might have been useful strategies to resolve conflicts and reduce the time taken to reach mutually acceptable agreements.

SECTION FIVE: CONCLUSIONS

In an era of increasing turbulence, the ecosystem approach offers a method of obtaining maximum coordinated control, not only of the decision-making environment, but of the natural environment as well. Although the full use of the approach requires a large initial investment, its benefits (see Section Three 5.0 page 54) can be used to form a substantial argument for its use. All of the elements necessary for a broad-scale implementation of the approach seem to be present, to some degree; the current challenge lies with their integration and application.

It is strongly recommended that the most effective strategy for granting serious credibility to the ecosystem approach is the successful completion of a demonstration project: and ecosystem modelling, policy making and strategy development program. This project should be attempted in an area where it would be both useful and acceptable - perhaps in the Toronto area where many of the agencies are familiar with the concept through the August workshop conducted by the authors. This area has a number of other key elements as well: sufficient data has been (and continues to be) collected for both quantitative and qualitative modelling purposes; an academic support group exists at the University of Toronto which is currently planning an introductory spring symposium (see Appendix 3); Environment Canada personnel have been involved in the workshop and planning for the symposium from the outset; and the aquatic ecosystem presents severe challenges to elected and government officials, as its deteriorated condition prevents the increasing public from enjoying Toronto's waterfront.

Two possibilities for the use of the ecosystem approach are suggested here, although only the second has the support of the academic Rehabilitation Groups. (1) The academic community, with the financial and technical support of Environment Canada, could develop a model of the ecosystem, including socio-economic impacts, and a plan for its management. This plan would clearly outline the benefits of short and long term rehabilitation to all parties affected, in terms that each party would understand. The plan could then be presented to local provincial and municipal politicians and the provincial Cabinet Committee for Resource Development. At the same time, a series of workshops, bringing together key agency, public and academic representatives could explore the acceptability and feasibility of the proposed rehabilitation

plan.

(2) Alternatively, these workshops could be a forum for development of the plan. The workshops would be intended as an initiating device for interagency policy and management strategy development processes. Previous to and concurrent with these efforts, the academic community and Environment Canada could make available to the public, information on relevant issues of public concern, so that public and political support would stand behind the plan.

6.0 BIBLIOGRAPHY

- Adams, J.S. 1976. "Organization Boundary Behaviour: Toward A General Model"
Paper presented at the annual meeting of the American Psychological Assoc.
Washington, D.C.
- Aiken, M. and J. Hage. 1968. "Organizational Interdependence and Intra-
Organizational Structure" American Sociological Review 33:912-30
- Bacharach, S.B. and E.J. Lawler, 1980. Power and Politics in Organizations.
Jossey-Bass Publishers, San Francisco, Washington, London
- Bensen, J.K., 1975. "The Interorganizational Network as a Political Economy"
Administrative Science Quarterly 20:229-49
1982. "A Framework for Policy Analysis" In: David L. Rogers and
David A. Whetten (eds) Interorganizational Coordination: Theory, Research
and Implementation Ames: Iowa University Press
- Bingham, G. 1982. Using Negotiation Effectively in Resolving Environmental
Disputes. Exerpts from a training course developed by the Conservation
Foundation 10pp.
- Black, B.J. and H.M. Kase. 1963. "Interagency Cooperation in Rehabilitation
and Mental Health" Social Service Review 37:26-32
- Brandt, Hon. Andrew S. "Statement to the Legislature on the Hydrogeological Study
of the Eric Pauze Construction Ltd. Waste Disposal Site and the Minister's
Action Plan" Queen's Park, Ontario December 1, 1983
- Brilliant, E.L. 1973. "Public or Private: A Model of Ambiguities" Social
Service Review 47:384-96
- Britan, G.M. 1981. Bureaucracy and Innovation. Sage Publications, Beverly
Hills, London
- Clark, B.R. 1965. "Interorganizational Patterns in Education" Administrative
Science Quarterly 10: 224-37
- Cook, K.S. 1977. "Exchange and Power in Networks of Interorganizational
Relations" The Sociological Quarterly 18: 62-82
- Cormick, G.W. 19 . "The 'Theory' and practice of Environmental Mediation"
The Environmental Professional 2(1): 24-33
- Cormick, G.W. and P. Leah. 1977. "Environmental Mediation: Potentials and
Limitations" Environmental Comment May 1977: 13-15
- Emery, F.E. and E.L. Trist. 1973. Towards a Social Ecology: Contextual
Appreciations of the Future in the Present. New York: Plenum
- Estrin, D. and J. Swaigen, 1978. Environment on Trial: A Handbook of Ontario
Environmental Law. Revised Edition. Canadian Environmental Law Research
Foundation, Toronto

- Francis, G.R. Magnuson, J.J., Regier, H.A. and D.R. Talhelm. 1979. Rehabilitating Great Lakes Ecosystems Great Lakes Fishery Commission Technical Report No. 37, Ann Arbor, Michigan 48105
- Francis, G.R. Grima, A.P., Regier, H.A. and T.H. Whillians. 1984. A Prospectus for the Management of the Long Point Ecosystem. Great Lakes Fishery Commission Technical Report No. 39. Ann Arbor, Michigan 48105
- Gans, S.P. and G.T. Horton. 1975. Integration of Human Services: The State and Municipal Levels. New York: Praeger Publications
- Grizzle, G.A. 1982. "Plural Policy-Making Bodies: Decision Strategies." Administration and Society 14(1): 81-99
- Haas, J.E. and T.E. Drabek. 1973. Complex Organizations: A Sociological Perspective. New York: MacMillan
- Harris, H., D.R. Talhelm, J.J. Magnuson and A.M. Forbes. 1982. Green Bay in the Future - A rehabilitation Prospectus. Great Lakes Fishery Commission Technical Report No. 38, Ann Arbor, Michigan 48105
- Howard, R. 1980. Poisons in Public: Case Studies of Environmental Pollution in Canada. James Lorimer and Company
- International Working Group on the Abatement and Control of Pollution from Dredging Activities. 1975. Report. International Joint Commission
- International Joint Commission, Great Lakes Water Quality Board. 1982. Guidelines and Register for Evaluation of Great Lakes Dredging Projects. Report of the Dredging Subcommittee.
- Lee, B.J., 1982. "Case Study of Dredging and Dredgeate Disposal in the Keating Channel, Toronto Harbour 1974-82". Report for the Institute for Environmental Studies, University of Toronto
- Lorant, F.I. 1981. Keating Channel Flood Inquiry Report.
- Miller, D.C. and W.H. Form. 1964. Industrial Sociology: The Sociology of Work Organizations 2nd ed. New York: Harper and Row
- MTRCA/Acres Consulting Services Ltd. 1982. Keating Channel Environmental Assessment Draft. March 1982
- Munson, M.J. 1977. "Intraorganizational Aspects and Agency Effectiveness" Growth and Change January 1977: 3-10
- Nelson, J.G., Day J.C. and S. Jessen. 1980. "Environmental Regulation of the Naticoke Industrial Complex" Economic Council of Canada Regulation Reference Working Paper No. 7. 82pp.
- O'Toole, R., O'Toole, A., McMillan, R.G. and M. Lefton. 1972. The Cleveland Rehabilitation Complex: A Study of Interagency Coordination. Cleveland Vocational Guidance and Rehabilitation Services.
- Rogers, D.L. and C.L. Mulford. 1982. "Definitions and Models" and "The

- Historical Development" pp. 9-54 In: David L. Rogers and David A. Whetten (eds) Interorganizational Coordination: Theory, Research and Implementation. Ames: Iowa University Press.
- Schrybman, S. 1984. "Environmental Mediation: From Theory to Practice". Canadian Environmental Law Association. 113pp.
- Slater, R. 1983. "Luncheon Address" Environmental Mediation in Canada: Seminar Proceedings. Ottawa 14-15. EMI pp. 57-61
- Shrecker, T. undated. The Political Economy of Environmental Hazards. Canada Law Reform Commission.
- Stone, A. 1978. "Planning, Public Policy and Capitilism" In: T.J. Lowi and A. Stone (eds) Nationalizing Government: Public Policies in America. Sage Publications, Beverly Hills, California.
- Yarbrough, C.J. 1984. "Multi-Institutional Management: The Green Bay Experience" Paper presented to the Social and Economic Considerations Committee, International Joint Commission.

APPENDIX 1: INDIVIDUALS INTERVIEWED

Much of our information and ideas were drawn from discussions with a wide variety of government and academic people who have some experience with interagency interactions and/or the ecosystem approach. Since our provincial government contacts were Ontario government people, and many of our examples are drawn from Ontario, much of the discussion refers primarily to the situation in Ontario, although it is generally applicable elsewhere in Canada.

The following is a list of people interviewed:

Dr. George Arras	Senior Policy Analyst, Policy and Planning Branch, Ontario Ministry of the Environment.
Robert Chang	Acting Manager, Technical Services Section, Conservation Authorities and Water Management Branch, Ontario Ministry of Natural Resources.
Dr. Robert Dorney	School of Urban and Regional Planning, University of Waterloo.
Dr. George Francis	Man-Environment Studies University of Waterloo.
Dr. Isobel Heathcote	Supervisor, Investigations and Surveillance Unit, Great Lakes Section, Water Resources Branch, Ontario Ministry of the Environment.
Simon Llewellyn	Manager, Pollution Control Division, Environmental Protection Service, Environment Canada.
Gerry McKeating	Acting Eastern Habitat Co-ordinator, Canadian Wildlife Service, Environment Canada.
Sue Milburn	Technical Officer, LRTAP Liaison Office, Atmospheric Environment Service, Environment Canada.
Dr. Victor Milne	Director, Ontario Geological Survey, Mineral Resources Branch, Ontario Ministry of Natural Resources.
Gary McCulloch	Habitat and Ecological Assessment Biologist, Canadian Wildlife Service, Environment Canada.

Dr. Don Munton	Director of Research, Canadian Institute of International Affairs.
Ken Ogilvie	Acting Regional Director, Planning and Evaluation, Ontario Region, Environment Canada.
Ian Orchard	Senior Environmental Design Officer, Pollution Control Division, Environmental Protection Service, Environment Canada.
Mel Plewes	Assistant Director, Central Region, Ontario Ministry of the Environment.
Dr. Henry Regier	Institute for Environmental Studies, University of Toronto.
Paul Rennick	Senior Advisor, Environmental Planning Division, Ontario Ministry of the Environment.
Dr. R.W. Shaw	Head, LRTAP Liaison Office, Atmospheric Environment Service, Environment Canada.
Griff Sherbin	Acting Manager, Pollution Control Division, Environmental Protection Service, Environment Canada.
Kim Shikaze	Regional Director, Planning and Evaluation, Ontario Region, Environment Canada.
Sam Singer	Water Management Co-ordinator, Capital Improvements Branch, Ontario Ministry of Agriculture and Food.
William Steggles	Environmental and Technical Advisor, Ontario Ministry of the Environment.
Geoffrey Thornburn	Economic Advisor, Canadian Section, International Joint Commission.
Dr. Jack Vallentyne	Senior Scientist, Bayfield Laboratories of Marine Science and Surveys, National Water Research.
Dr. Leslie Whitby	Toxic Chemicals Senior Manager, Environment Canada.

APPENDIX 2: INTERAGENCY THEORY

It would be expected that literature in the following fields would contribute to interagency theory: organizations, bureaucracies, democracy and bureaucracy and public administration. In fact, only the literature on organizations has developed a substantial body of work on interagency relations. Astley et al (1983) has organized current organization theories into four central perspectives: (1) the classical system-structural view; (2) the psychological/interactional strategic choice view; (3) the natural selection view; and (4) the collective action view; the last of which encompasses this field. Although it is intended by Astley et al to be a perspective on the entire field of organizational theory, its stress on collective control over the environment is, at the same time, the primary basis for more specialized studies of the mechanisms of control.

The "collective action" view is promoted by social ecologists (Emery and Trist 1973), human ecologists (Hawley 1950, 1968), and social planning theorists (Vickers 1965, Schon 1971, Michael 1983, Ackoff 1974 and Warren, Rose and Burgunder 1974). These theorists understand modern corporate society to be guided and constructed by collective collaborated choice rather than, for example, ruthless competition in unyielding environments, the model used for the natural selection view (#3 above). The operational mode for this collaboration is the interorganizational network, "an interlocking system of exchange relationships negotiated between members of different organizations as they jointly shape their environments" (Cook 1977, in Astley et al 1983). These networks evolve collective working rules of action which allow them to make decisions in the interests of both the collective unit and its individual members. Just how much of the polity external to the organizations themselves should be considered as part of these units and what the gains are of collective action, are research questions which have taken a back seat to the primary organizational focus; identification of the operating rules.

To recapitulate, this work confines itself primarily to issues of organizational control and efficiency, and this in a highly abstract way. Client needs, perceptions and evaluations are either ignored or dealt with in cursory fashion. "Less is known about the impact of interorganizational coordination on clients than on all other interest groups (e.g. administrative, coordinating and support)." (Rogers and Mulford 1982, p. 92). With some exceptions, analyses have been apolitical and as such, without social context. The degree to which coordination has improved service for clients and society at large is therefore rarely addressed. In this highly restricted framework, coordination has been assumed to be good and has generally been assumed to be possible only if the participating agencies maintain their autonomous positions. Conflicts between agencies are seen to be resolved through discussion and persuasion and the resulting redistribution of agency resources is assumed to produce maximum benefits for the system as a whole.

Issues of conflicts of interest and values, bargaining, coercion and force are not addressed by this model, nor are the larger social issues of bureaucratic responsiveness to public concern, equity of service distribution, and monopoly of policy development by professionals and the "technocratic elite". Bensen (1982) lists other problems with this framework. Because it is context (and value) free, it has become a tool or a technology available to "those whose interests and power make it useful to them". The theory provides little help to those who wish to draw these techniques back to their influence on the community or the environment. It also lodges control firmly in the hands of those for whom it is written.

Alternative frameworks usually have their basis in critical sociology (Habermas 1975) Marxist class analysis (Bensen 1982) or community development, power and decision-making (Warren 1967, 1974). Benson (1975, 1982), Karpick (1977, 1978) and Stinchcombe 1965) have used some of this theoretical work to develop contextual models for interorganizational analysis. For our purposes, this work can be used to define a

larger field of concern: an awareness of the role of public interest groups and the public at large in environmental management and policy development; an understanding of the social and political bases for conflicting interests and the methods and implications of conflict resolution; and perhaps, most importantly, an understanding of the limits to which the adjudication of identified interests can be used to set larger social and environmental goals.

REFERENCES CITED

- Ackoff, R. 1974. Redesigning the Future. New York. Wiley
- Astley, W.G. and A.H. Van de Ven, 1983. "Central Perspectives and Debates in Organization Theory!" Administrative Science Quarterly 28(2): 245-73
- Emery F.E. and E.L. Trist, 1973. Towards a Social Ecology: Contextual Appreciations of the Future in the Present. New York: Plemun
- Habermas, J. 1975. Legitimation Crisis. Translated by Thomas McCarthy Boston: Beacon Press
- Hawley, A. 1950. Human Ecology: A theory of community structure. New York: Ronald Press
1968. "Human Ecology" In: David L. Sills (ed) The International Encyclopedia of the Social Sciences 4: 328-337 New York: Crowell-Collier and McMillan
- Karpik, L. 1977. "Technological Capitolism" In Stewart Clegg and David Dunderly (eds) Critical Issues in Organization pp.41-74 London: Routledge and Kegan Paul
- Michael, D. 1973. On Learning to Plan - Planning to Learn. San Fransisco: Jossey-Bass
- Rogers, D.L. and C.L. Mulford, 1982. "The Historical Development" In: David L. Rogers and David A. Whetten and Associates. Interorganizational Coordination: Theory, Research and Implementation. pp.32-53 Ames: Iowa State University Press
- Schon, D. 1971. Beyond the Stable State. New York: Basic Books
- Thompson, J.D., 1967. Organizations in Action. New York: McGraw-Hill
- Vickers, Sir G. 1965. The Art of Judgement. New York: Basic Books
- Warren, R.L. 1967. "The Interorganizational Field as a Focus for Investigation" Administrative Science Quarterly 12: 396-419
1971. "Alternative Strategies of Interagency Planning" In: Paul White and George Vlasak (eds) Interorganizational Research in Health. pp. 114-28 Conference Proceedings. Baltimore: Johns Hopkins University Press.
- Warren, R.L., Rose, S. and A. Bergunder. 1974. The Structure of Urban Reform Lexington MA: D.C. Heath
- Whetten, D.L., 1982. "Issues in Conducting Research" In: David L. Rogers and David A. Whetten (eds) Interorganizational Coordination: Theory, Research and Implementation. Ames: Iowa University Press pp.97-121

APPENDIX 3: NOTES FROM THE TORONTO AQUATIC ECOSYSTEM REHABILITATION WORKSHOP

The authors held a workshop at Innis College, University of Toronto on August 9th, to explore the feasibility of using the ecosystem approach to manage the area involved in the initial case study - the Toronto waterfront and its contributing watersheds. Participants were drawn from relevant government authorities, public interest groups and the individuals at the University of Toronto who had hosted the previous rehabilitation workshops in Green Bay, the Bay of Quinte and, most recently, Long Point. They are listed in Figure 1.

The workshop began with a brief discussion of the meaning of "ecosystem approach" and its past applications. Key points which emerged as having particular relevance to Toronto Harbour were:

- o The ecosystem approach focuses on the interaction of stresses on the ecosystem. This requires responsible agencies to consider these interactions in the design of management policies and programs rather than to consider stresses in isolation.
- o An overall goal for rehabilitation and management is set by the relevant agencies and public interest groups, once the boundaries of the ecosystem in question have been defined.
- o All agencies which have a mandate to plan/manage/fund/or otherwise support involvement in the stresses defined, are identified. Jurisdictional gaps and overlapping or confused mandates are also identified. Jurisdictional problems are a major stumbling block to effective ecosystem rehabilitation.
- o The ecosystem approach is a pro-active as well as reactive approach to environmental management.

The discussion then turned to consideration of some of the problems in implementing the ecosystem approach in Toronto Harbour. Two key issues emerged, in addition to the jurisdictional problem. The first is the motivation of the relevant agencies to become involved in the process. The second is the competition of ecosystem values with the prevailing development-

FIGURE 1: WORKSHOP PARTICIPANTS

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* Invited, but were unable to attend

oriented values held by most government agencies and public(s) in the city. Both private developers and public agencies, such as the Toronto Harbour Commissioners have major development interests on the Toronto waterfront, which would not easily accommodate to the requirements of ecosystem rehabilitation.

A number of stresses on the Toronto waterfront and in the Don River watershed were then identified and prioritized. Their sources were outlined, as were possible rehabilitation techniques. Finally, a list of relevant agencies and public interest groups was drawn up. The most important and difficult issue which emerged was the need to assess the interactions of both the stresses and the potential solutions. In some cases, the latter exacerbated one stress, while relieving another; in others, remedial action relieved more than one stress. Figure 2 lists these stresses, their sources and possible solutions. Figure 3 lists relevant agencies and interest groups.

Finally, the workshop dealt with a number of strategies that would be necessary to implement the ecosystem approach in the Toronto watershed. These would focus on motivating the agencies and public interest groups to become involved, by demonstrating the benefits of doing so. They would include: the use and, in some instances, the creation of public pressure on politicians and senior government personnel to act on ecosystem programs; education of the public and agency personnel about the ecosystem approach; and finally, the creation of a series of rehabilitation workshops to unite interested academics and government personnel in a Toronto-based working group. Points which were made in relation to these strategies are listed below:

1. Stress the fact that much of the data for ecosystem rehabilitation on the Toronto waterfront and in the contributing watersheds is already accessible, if not yet already available.
2. Give top priority to those issues which now have a high public profile to create political pressure as quickly and expediently as possible. For the Toronto watershed, these are:

FIGURE 2: ECOSYSTEM STRESSES AND REHABILITATION MECHANISMS FOR THE TORONTO WATERFRONT -DON WATERSHED (PRELIMINARY LIST)

<u>Stresses</u>	<u>Contributing Factors</u>	<u>Rehabilitation Techniques</u>
Heavy Flows	Headwater urbanization Heavy urban streamflows No streambank resistance	Storm-water retention, particularly in stream valleys Underground reservoirs Damming with conservation pools
Sedimentation	Instream erosion Overland sheet erosion (Urbanization) Dredging	Major technique - controlling flows Streambank stabilization Toxic immobilization
Toxics and Contaminants	Leaded gasoline Other toxics from urban run-off, ie, zinc, copper Airborn contaminants Household toxics Industrial sources Road salts Harbour activities, ie grease, oil, anti-fouling paint	The TAWMS report is dealing with this - including: Limit road salting Storm water retention Education and programs for disposal of household toxics Legislate no-lead gas Check industrial sources
Bacteria (Nutrients) (Human pathogens)	Sewer outfalls STP outfalls Gulls and terns, animal wastes	Separate sewers and treat storm-water
Temperature	Depth Turbidity Industrially heated discharges	
Interference with Littoral drift	Shoreline restructuring Lakefilling	

FIGURE 3: GOVERNMENT AGENCIES AND PUBLIC INTEREST GROUPS INVOLVED IN THE
TORONTO WATERSHED (PRELIMINARY LIST)

Government Agencies

International: International Joint Commission
Great Lakes Fishery Commission

Federal: Environment Canada
Transport Canada
Fisheries and Oceans
Public Works Canada
Harbourfront Corporation

Provincial: Ontario Ministry of Environment
Ontario Ministry of Natural Resources

Regional: Metropolitan Toronto and Region Conservation Authority

Municipal: Toronto Harbour Commissioners (also a federal body)
Metro Toronto
The City of Toronto (Planning and Development Department
Department of Public Works
Department of Public Health
Parks Department)
Other Boroughs

Public Interest Groups

Canadian Environmental Law Association
Stop Contaminating Our Waterfront
Toronto Field Naturalists
Friends of the Spit
Toronto Island Residents Association
Forward 9
Federation of Ontario Naturalists
Boating Associations
Save Our Spit
Great Lakes United
Ontario Federation of Hunters and Anglers (Toronto clubs)

drinking water quality, swimming restrictions on Toronto beaches, waterfront development, public access to the waterfronts, the future of the Leslie Street Spit and contaminant levels in sport fish.

3. Create public concern over issues which currently have a low profile. Urban fishing is a prime example. The creation of a public constituency for fishing creates, at the same time, a group which will be concerned about the quality of the water and their fish catch.
4. "Piggy-back" issues which do not have current public support onto issues which do, alleviating, where possible, a number of stresses at once.
5. Show how the ecosystem approach can help to avoid costly mistakes which may occur when problems are dealt with in piece-meal fashion. For example: (1) Storm water and sanitary sewer separation creates new problems if the storm water is not subsequently treated. Storm water may be as polluted as that from the sewerage systems, bacteria excluded. (2) The Humber River diversion may simply move the problem of bacterial contamination as well. (3) Reduction of high flow rates in the Don River for flood control would also reduce sedimentation and toxic input to the Keating Channel and Inner Harbour, allowing the partial restoration of habitat for fish and benthic organisms.
6. Propose incremental steps to the ultimate rehabilitation goal, so that both politicians and the public can see continued progress. This gives politicians concrete successes as evidence of the effectiveness of the rehabilitation programs and maintains public support.
7. To bring agency members and the public together, initiate a series of informal workshops. These should involve public interest groups, interested agency personnel and academics and should be hosted by the latter. In this way, agency members can consider new management approaches on "neutral" ground, without pressure from others with whom they may already be in conflict on other issues. These workshops can form the basis of continuing interagency working groups, which can then develop appropriate measures for conflict-resolution and decision-making.

After the workshop, each participant received a summary of its proceedings, with the following covering letter, and suggestions for the format and content of a spring seminar/workshop (see Point #7 above). If this second workshop takes place, it will be under the management of the Great Lakes Ecosystem Rehabilitation Group at the University of Toronto - specifically, Dr. Henry Regier - possibly assisted by the Canadian Environmental Law Research Foundation.

36 Brunswick Avenue #11
Toronto, Ontario M5S 2L7
14 September 1984

Thank you for taking time to come to our aquatic rehabilitation seminar on August 9th. Notes from our discussion are enclosed for your records. The most important conclusion reached among those present was to continue collaborative work on rehabilitation in further workshops. These could be organized and hosted by the University of Toronto Group of the inter-university Great Lakes Rehabilitation (GLER) network, perhaps in cooperation with the Canadian Environmental Law Research Foundation (CELRF). They should involve all relevant agencies and publics as well as interested academics, and might be scheduled for the spring of 1985.

GLER networkers use the term "Toronto Aquatic Ecosystem" for the streams draining the area in and near Metropolitan Toronto, the harbour, spit, the Islands and waterfront areas, plus the nearshore parts of Lake Ontario, out to several kilometers from the shore. Some of these people have been involved in studies of this area for up to 30 years.

The initial spring workshop could be organized and funded in a number of ways. One possible format, which is enclosed with this letter, would involve a two-day symposium open to the public and a subsequent workshop for invited personnel. Papers presented at the symposium would be edited and compiled into a publication which would essentially summarize the Toronto Aquatic Ecosystem data for future workshops. This would be a useful reference for all groups concerned with rehabilitation: university, corporate, governmental and public interest. Products from the workshop

following the symposium would depend upon the needs and opinions of those present. Previous GLER workshops, for Green Bay in Lake Michigan and Long Point Bay in Lake Erie, have produced technical and semi-technical publications on the ecological and institutional situations (ecological stresses, jurisdictional mandates, public uses and interrelationships within between each) and strategic advice, but did not attempt to design detailed rehabilitation procedures. It may be that individuals wishing to move more quickly in Toronto will form a working group to develop such procedures; this group would need to include all agencies responsible for implementation, all relevant and concerned public interest groups and interested academics.

The expenses involved will depend primarily on the costs of producing and editing the symposium papers. If more than a token honorarium is paid for each paper and editing costs are high, the total bill could exceed \$25,000. Volunteer work could reduce this substantially. Part of the work and costs will likely be assumed by the GLER group, but their minimal budget will require large inputs from outside sources. These could be in the form of agency grants or participant fees or both. A number of individuals present at the August 9th seminar offered potential financial support from their agencies.

I would appreciate your comments, both on the proposed format and on sources of funding. Meetings will be held by the inter-university GLER group at the University of Toronto this fall to plan and budget the coming year's activities. I will be in touch with you in the next few weeks about your interest in a spring rehabilitation workshop and the issues of paper presentation and funding - so that the GLER group can get workshop planning underway.

Sincerely,

Brenda Lee

Enclosures

PROPOSED OUTLINE FOR THE TORONTO AQUATIC ECOSYSTEM
REHABILITATION WORKSHOP I

DAY ONE: PUBLIC SYMPOSIUM

Presentation and discussion of papers on items one through four or five (see attached sheet) by members of the designated agencies.

DAY TWO: PUBLIC SYMPOSIUM

Presentation and discussion of remaining papers. Item 6: Environmental Management, will be distributed among several agencies and will comprise most of the day's presentations.

DAY THREE: WORKSHOP FOR INVITED PARTICIPANTS

Discussion among invited members of government agencies, public interest groups and universities about the formation of a permanent rehabilitation working group.

Further discussion and organization of material presented in the preceding two days, perhaps along the following lines:

1. Define the important environmental parameters.
2. Discuss the state of present monitoring data and knowledge about these parameters in light of historic changes in the aquatic communities.
3. Identify the causes of the present levels of degradation (stresses).
4. Develop a list of secondary considerations or transport mechanisms which modify the initial stresses (i.e., follow them through the ecosystem).
5. Priorize the stresses as to their significance in ecosystem degradation.
6. Draw up an interaction matrix, relating the stresses to each other.

Proposed Papers for the First Toronto Aquatic Ecosystem

Rehabilitation Workshops (to be given over two days):

1. Development: existing and planned urban/industrial
 - City of Toronto Planning and Development Department
 - Toronto Harbour Commissioners
2. Transportation: related risks; dredging; future port expansion
 - Toronto Harbour Commissioners
3. Recreation: public access, harbour and aquatic park use, urban fishing possibilities
 - City of Toronto Planning and Development Department
 - Metro Toronto and Region Conservation Authority (MTRCA)
4. Building of Spits: effects on the lake and marinas
 - MTRCA
 - Toronto Harbour Commissioners
5. Flood Protection
 - MTRCA
6. Environmental Management: area of concern under the International Joint Commission; including water quality, drinking water, habitat availability, biota
 - Ontario Ministry of the Environment
 - Environment Canada
 - MTRCA
7. Impasse in Decision-making: conflicting functions, jurisdictional problems, no obvious lead agency, opportunities for co-ordination
 - GLER group
 - Canadian Environmental Law Research Foundation

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THE ECOSYSTEM APPROACH AS A FRAMEW
PROBLEM SOLVING 1984.

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